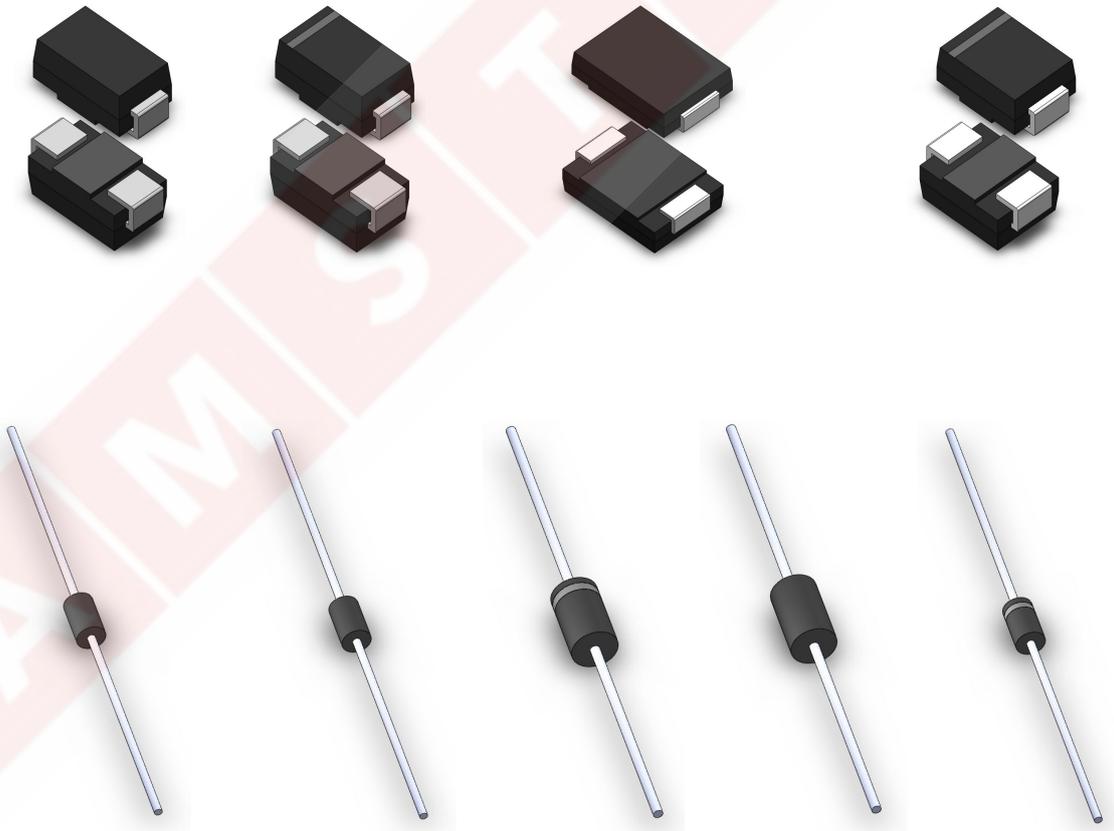


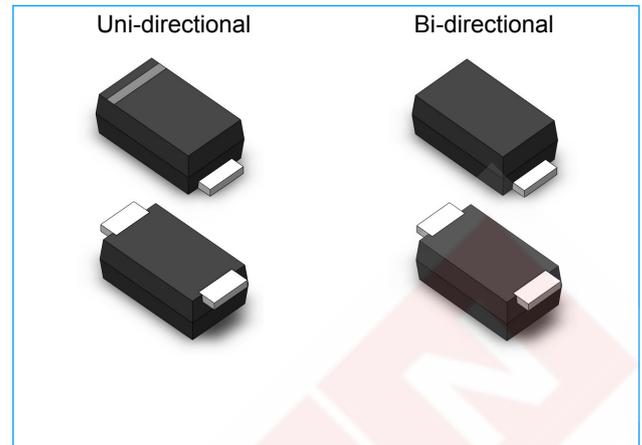
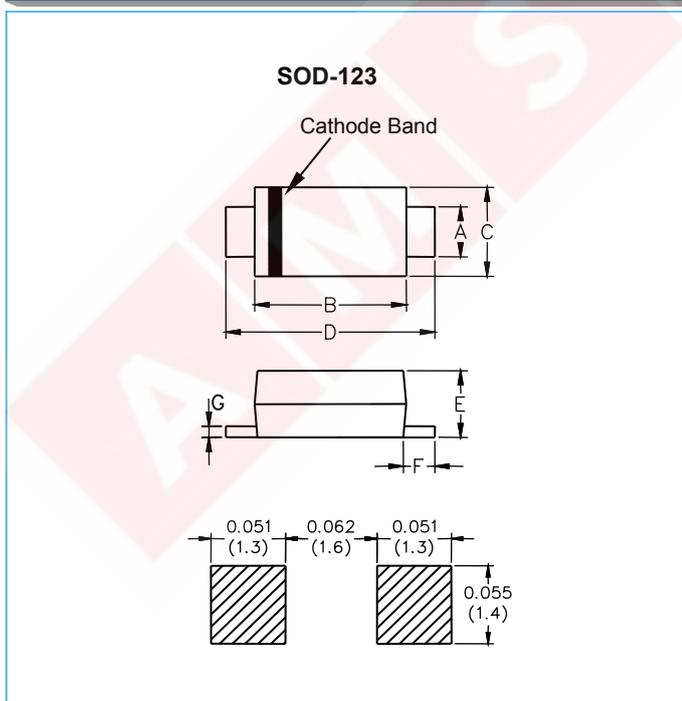
Transient Voltage Suppressors

TVS 瞬態抑制二極管



Surface Mount Transient Voltage Suppressors (TVS)
SMF Series 5.0 To 190 V 200W
Features

- ◆ Compatible with industrial standard package SOD-123
- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 200W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


SOD-123
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.031	0.044	0.77	1.09
B	0.1	0.112	2.51	2.81
C	0.055	0.071	1.38	1.78
D	0.140	0.152	3.51	3.82
E	0.037	0.053	0.93	1.33
F	0.01	-	0.25	-
G	-	0.008	-	0.20

Electrical Characteristics (T_A=25°C unless otherwise noted)

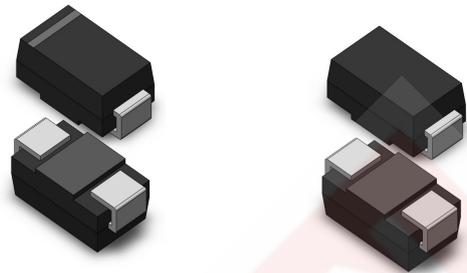
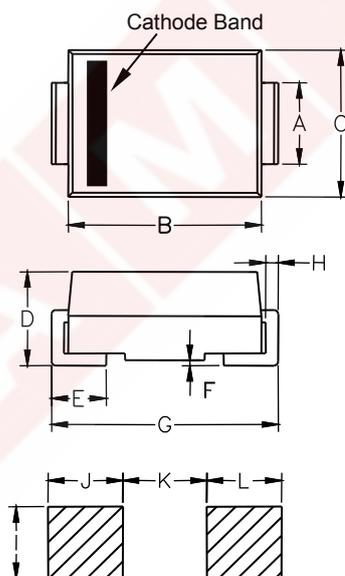
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMF5.0A	SMF5.0CA	FE	KE	5.0	6.40	7.00	10	9.2	21.74	400
SMF6.0A	SMF6.0CA	FG	KG	6.0	6.67	7.37	10	10.3	19.42	400
SMF6.5A	SMF6.5CA	FK	KK	6.5	7.22	7.98	10	11.2	17.86	250
SMF7.0A	SMF7.0CA	FM	KM	7.0	7.78	8.60	10	12.0	16.67	100
SMF7.5A	SMF7.5CA	FP	KP	7.5	8.33	9.21	1	12.9	15.50	50
SMF8.0A	SMF8.0CA	FR	KR	8.0	8.89	9.83	1	13.6	14.71	25
SMF8.5A	SMF8.5CA	FT	KT	8.5	9.44	10.40	1	14.4	13.89	10
SMF9.0A	SMF9.0CA	FV	KV	9.0	10.00	11.10	1	15.4	12.99	5
SMF10A	SMF10CA	FX	KX	10.0	11.10	12.30	1	17.0	11.76	2.5
SMF11A	SMF11CA	FZ	KZ	11.0	12.20	13.50	1	18.2	10.99	2.5
SMF12A	SMF12CA	HE	LE	12.0	13.30	14.70	1	19.9	10.05	2.5
SMF13A	SMF13CA	HG	LG	13.0	14.40	15.90	1	21.5	9.30	1
SMF14A	SMF14CA	HK	LK	14.0	15.60	17.20	1	23.2	8.62	1
SMF15A	SMF15CA	HM	LM	15.0	16.70	18.50	1	24.4	8.20	1
SMF16A	SMF16CA	HP	LP	16.0	17.80	19.70	1	26.0	7.69	1
SMF17A	SMF17CA	HR	LR	17.0	18.90	20.90	1	27.6	7.25	1
SMF18A	SMF18CA	HT	LT	18.0	20.00	22.10	1	29.2	6.85	1
SMF19A	SMF19CA	HB	LB	19.0	21.10	23.30	1	30.6	6.54	1
SMF20A	SMF20CA	HV	LV	20.0	22.20	24.50	1	32.4	6.17	1
SMF22A	SMF22CA	HX	LX	22.0	24.40	26.90	1	35.5	5.63	1
SMF24A	SMF24CA	HZ	LZ	24.0	26.70	29.50	1	38.9	5.14	1
SMF26A	SMF26CA	JE	ME	26.0	28.90	31.90	1	42.1	4.75	1
SMF28A	SMF28CA	JG	MG	28.0	31.10	34.40	1	45.4	4.41	1
SMF30A	SMF30CA	JK	MK	30.0	33.30	36.80	1	48.4	4.13	1
SMF33A	SMF33CA	JM	MM	33.0	36.70	40.60	1	53.3	3.75	1
SMF36A	SMF36CA	JP	MP	36.0	40.00	44.20	1	58.1	3.44	1
SMF40A	SMF40CA	JR	MR	40.0	44.40	49.10	1	64.5	3.10	1
SMF43A	SMF43CA	JT	MT	43.0	47.80	52.80	1	69.4	2.88	1
SMF45A	SMF45CA	JV	MV	45.0	50.00	55.30	1	72.7	2.75	1
SMF48A	SMF48CA	JX	MX	48.0	53.30	58.90	1	77.4	2.58	1
SMF51A	SMF51CA	JZ	MZ	51.0	56.70	62.70	1	82.4	2.43	1
SMF54A	SMF54CA	XE	NE	54.0	60.00	66.30	1	87.1	2.30	1
SMF58A	SMF58CA	XG	NG	58.0	64.40	71.20	1	93.6	2.14	1
SMF60A	SMF60CA	XK	NK	60.0	66.70	73.70	1	96.8	2.07	1
SMF64A	SMF64CA	XM	NM	64.0	71.10	78.60	1	103.0	1.94	1
SMF70A	SMF70CA	XP	NP	70.0	77.80	86.00	1	113.0	1.77	1
SMF75A	SMF75CA	XR	NR	75.0	83.30	92.10	1	121.0	1.65	1
SMF78A	SMF78CA	XT	NT	78.0	86.70	95.80	1	126.0	1.59	1
SMF80A	SMF80CA	XB	NB	80.0	88.80	97.60	1	129.0	1.55	1
SMF85A	SMF85CA	XV	NV	85.0	94.40	104.00	1	137.0	1.46	1
SMF90A	SMF90CA	XX	NX	90.0	100.00	111.00	1	146.0	1.37	1
SMF100A	SMF100CA	XZ	NZ	100.0	111.00	123.00	1	162.0	1.23	1
SMF110A	SMF110CA	TE	PE	110.0	122.00	135.00	1	177.0	1.13	1
SMF120A	SMF120CA	TG	PG	120.0	133.00	147.00	1	193.0	1.04	1
SMF130A	SMF130CA	TK	PK	130.0	144.00	159.00	1	209.0	0.96	1
SMF140A	SMF140CA	TB	PB	140.0	155.00	171.00	1	224.0	0.89	1
SMF150A	SMF150CA	TM	PM	150.0	167.00	185.00	1	243.0	0.82	1
SMF160A	SMF160CA	TP	PP	160.0	178.00	197.00	1	259.0	0.77	1
SMF170A	SMF170CA	TR	PR	170.0	189.00	209.00	1	275.0	0.73	1
SMF180A	SMF180CA	TT	PT	180.0	200.00	220.00	1	292.0	0.69	1

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
SMAJ Series 5.0 To 440 V 400W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 400W Peak power capability at 10 × 1000µs waveform
- ◆ Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Uni-directional
Bi-directional

DO-214AC / SMA
Dimensions
DO-214AC (SMA)


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.064	1.230	1.630
B	0.162	0.179	4.10	4.550
C	0.099	0.109	2.510	2.760
D	0.077	0.089	1.960	2.260
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.192	0.206	4.87	5.220
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-

Surface Mount Transient Voltage Suppressors (TVS)
SMAJ Series 5.0 To 440 V 400W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMAJ5.0	SMAJ5.0C	AD	WD	5.0	6.40	7.30	10	9.6	41.67	800
SMAJ5.0A	SMAJ5.0CA	AE	WE	5.0	6.40	7.00	10	9.2	43.48	800
SMAJ6.0	SMAJ6.0C	AF	WF	6.0	6.67	8.15	10	11.4	35.09	800
SMAJ6.0A	SMAJ6.0CA	AG	WG	6.0	6.67	7.37	10	10.3	38.83	800
SMAJ6.5	SMAJ6.5C	AH	WH	6.5	7.22	8.82	10	12.3	32.52	500
SMAJ6.5A	SMAJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	35.71	500
SMAJ7.0	SMAJ7.0C	AL	WL	7.0	7.78	9.51	10	13.3	30.08	200
SMAJ7.0A	SMAJ7.0CA	AM	WM	7.0	7.78	8.60	10	12.0	33.33	200
SMAJ7.5	SMAJ7.5C	AN	WN	7.5	8.33	10.20	1	14.3	27.97	100
SMAJ7.5A	SMAJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	31.01	100
SMAJ8.0	SMAJ8.0C	AQ	WQ	8.0	8.89	10.90	1	15.0	26.67	50
SMAJ8.0A	SMAJ8.0CA	AR	WR	8.0	8.89	9.83	1	13.6	29.41	50
SMAJ8.5	SMAJ8.5C	AS	WS	8.5	9.44	11.50	1	15.9	25.16	10
SMAJ8.5A	SMAJ8.5CA	AT	WT	8.5	9.44	10.40	1	14.4	27.78	10
SMAJ9.0	SMAJ9.0C	AU	WU	9.0	10.00	12.20	1	16.9	23.67	5
SMAJ9.0A	SMAJ9.0CA	AV	WV	9.0	10.00	11.10	1	15.4	25.97	5
SMAJ10	SMAJ10C	AW	WW	10.0	11.10	13.60	1	18.8	21.28	5
SMAJ10A	SMAJ10CA	AX	WX	10.0	11.10	12.30	1	17.0	23.53	5
SMAJ11	SMAJ11C	AY	WY	11.0	12.20	14.90	1	20.1	19.90	5
SMAJ11A	SMAJ11CA	AZ	WZ	11.0	12.20	13.50	1	18.2	21.98	5
SMAJ12	SMAJ12C	BD	XD	12.0	13.30	16.30	1	22.0	18.18	5
SMAJ12A	SMAJ12CA	BE	XE	12.0	13.30	14.70	1	19.9	20.10	5
SMAJ13	SMAJ13C	BF	XF	13.0	14.40	17.60	1	23.8	16.81	5
SMAJ13A	SMAJ13CA	BG	XG	13.0	14.40	15.90	1	21.5	18.60	5
SMAJ14	SMAJ14C	BH	XH	14.0	15.60	19.10	1	25.8	15.50	5
SMAJ14A	SMAJ14CA	BK	XK	14.0	15.60	17.20	1	23.2	17.24	5
SMAJ15	SMAJ15C	BL	XL	15.0	16.70	20.40	1	26.9	14.87	5
SMAJ15A	SMAJ15CA	BM	XM	15.0	16.70	18.50	1	24.4	16.39	5
SMAJ16	SMAJ16C	BN	XN	16.0	17.80	21.80	1	28.8	13.89	5
SMAJ16A	SMAJ16CA	BP	XP	16.0	17.80	19.70	1	26.0	15.38	5
SMAJ17	SMAJ17C	BQ	XQ	17.0	18.90	23.10	1	30.5	13.11	5
SMAJ17A	SMAJ17CA	BR	XR	17.0	18.90	20.90	1	27.6	14.49	5
SMAJ18	SMAJ18C	BS	XS	18.0	20.00	24.40	1	32.2	12.42	5
SMAJ18A	SMAJ18CA	BT	XT	18.0	20.00	22.10	1	29.2	13.70	5
SMAJ19	SMAJ19C	BA	XA	19.0	21.13	25.76	1	34.0	11.76	5
SMAJ19A	SMAJ19CA	BB	XB	19.0	21.10	23.30	1	30.8	13.00	5
SMAJ20	SMAJ20C	BU	XU	20.0	22.20	27.10	1	35.8	11.17	5
SMAJ20A	SMAJ20CA	BV	XV	20.0	22.20	24.50	1	32.4	12.35	5
SMAJ22	SMAJ22C	BW	XW	22.0	24.40	29.80	1	39.4	10.15	5
SMAJ22A	SMAJ22CA	BX	XX	22.0	24.40	26.90	1	35.5	11.27	5
SMAJ24	SMAJ24C	BY	XY	24.0	26.70	32.60	1	43.0	9.30	5
SMAJ24A	SMAJ24CA	BZ	XZ	24.0	26.70	29.50	1	38.9	10.28	5
SMAJ26	SMAJ26C	CD	YD	26.0	28.90	35.30	1	46.6	8.56	5
SMAJ26A	SMAJ26CA	CE	YE	26.0	28.90	31.90	1	42.1	9.50	5
SMAJ28	SMAJ28C	CF	YF	28.0	31.10	38.00	1	50.0	8.00	5
SMAJ28A	SMAJ28CA	CG	YG	28.0	31.10	34.40	1	45.4	8.81	5
SMAJ30	SMAJ30C	CH	YH	30.0	33.30	40.70	1	53.5	7.48	5
SMAJ30A	SMAJ30CA	CK	YK	30.0	33.30	36.80	1	48.4	8.26	5
SMAJ33	SMAJ33C	CL	YL	33.0	36.70	44.90	1	59.0	6.78	5
SMAJ33A	SMAJ33CA	CM	YM	33.0	36.70	40.60	1	53.3	7.50	5
SMAJ36	SMAJ36C	CN	YN	36.0	40.00	48.90	1	64.3	6.22	5
SMAJ36A	SMAJ36CA	CP	YP	36.0	40.00	44.20	1	58.1	6.88	5
SMAJ40	SMAJ40C	CQ	YQ	40.0	44.40	54.30	1	71.4	5.60	5
SMAJ40A	SMAJ40CA	CR	YR	40.0	44.40	49.10	1	64.5	6.20	5
SMAJ43	SMAJ43C	CS	YS	43.0	47.80	58.40	1	76.7	5.22	5
SMAJ43A	SMAJ43CA	CT	YT	43.0	47.80	52.80	1	69.4	5.76	5

Surface Mount Transient Voltage Suppressors (TVS)
SMAJ Series 5.0 To 440 V 400W
Electrical Characteristics (T_A=25°C unless otherwise noted)

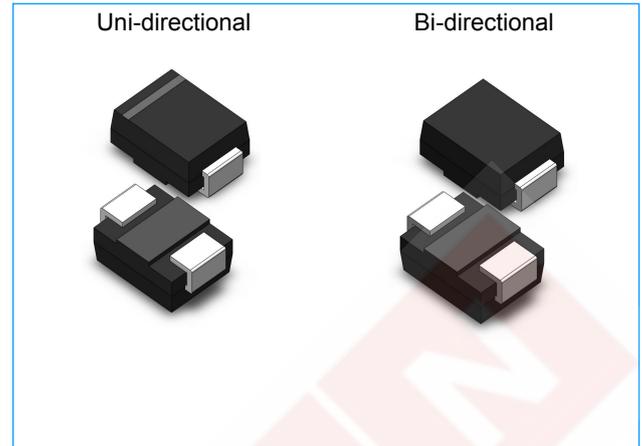
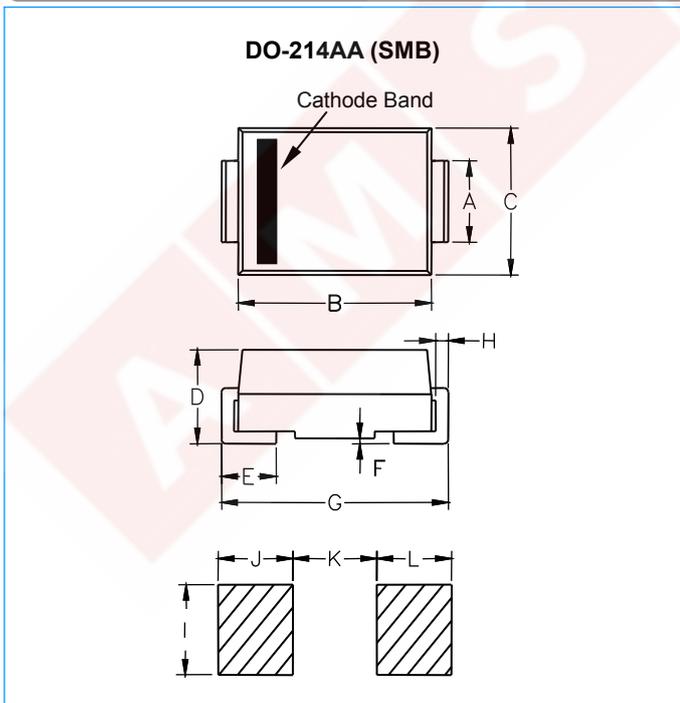
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMAJ45	SMAJ45C	CU	YU	45.0	50.00	61.10	1	80.3	4.98	5
SMAJ45A	SMAJ45CA	CV	YV	45.0	50.00	55.30	1	72.7	5.50	5
SMAJ48	SMAJ48C	CW	YW	48.0	53.30	65.10	1	85.5	4.68	5
SMAJ48A	SMAJ48CA	CX	YX	48.0	53.30	58.90	1	77.4	5.17	5
SMAJ51	SMAJ51C	CY	YY	51.0	56.70	69.30	1	91.1	4.39	5
SMAJ51A	SMAJ51CA	CZ	YZ	51.0	56.70	62.70	1	82.4	4.85	5
SMAJ54	SMAJ54C	RD	ZD	54.0	60.00	73.30	1	96.3	4.15	5
SMAJ54A	SMAJ54CA	RE	ZE	54.0	60.00	66.30	1	87.1	4.59	5
SMAJ58	SMAJ58C	RF	ZF	58.0	64.40	78.70	1	103.0	3.88	5
SMAJ58A	SMAJ58CA	RG	ZG	58.0	64.40	71.20	1	93.6	4.27	5
SMAJ60	SMAJ60C	RH	ZH	60.0	66.70	81.50	1	107.0	3.74	5
SMAJ60A	SMAJ60CA	RK	ZK	60.0	66.70	73.70	1	96.8	4.13	5
SMAJ64	SMAJ64C	RL	ZL	64.0	71.10	86.90	1	114.0	3.51	5
SMAJ64A	SMAJ64CA	RM	ZM	64.0	71.10	78.60	1	103.0	3.88	5
SMAJ70	SMAJ70C	RN	ZN	70.0	77.80	95.10	1	125.0	3.20	5
SMAJ70A	SMAJ70CA	RP	ZP	70.0	77.80	86.00	1	113.0	3.54	5
SMAJ75	SMAJ75C	RQ	ZQ	75.0	83.30	102.00	1	134.0	2.99	5
SMAJ75A	SMAJ75CA	RR	ZR	75.0	83.30	92.10	1	121.0	3.31	5
SMAJ78	SMAJ78C	RS	ZS	78.0	86.70	106.00	1	139.0	2.88	5
SMAJ78A	SMAJ78CA	RT	ZT	78.0	86.70	95.80	1	126.0	3.17	5
SMAJ80	SMAJ80C	RA	ZA	80.0	88.96	108.80	1	143.2	2.79	5
SMAJ80A	SMAJ80CA	RB	ZB	80.0	88.80	97.60	1	129.6	3.09	5
SMAJ85	SMAJ85C	RU	ZU	85.0	94.40	115.00	1	151.0	2.65	5
SMAJ85A	SMAJ85CA	RV	ZV	85.0	94.40	104.00	1	137.0	2.92	5
SMAJ90	SMAJ90C	RW	ZW	90.0	100.00	122.00	1	160.0	2.50	5
SMAJ90A	SMAJ90CA	RX	ZX	90.0	100.00	111.00	1	146.0	2.74	5
SMAJ100	SMAJ100C	RY	ZY	100.0	111.00	136.00	1	179.0	2.23	5
SMAJ100A	SMAJ100CA	RZ	ZZ	100.0	111.00	123.00	1	162.0	2.47	5
SMAJ110	SMAJ110C	SD	VD	110.0	122.00	149.00	1	196.0	2.04	5
SMAJ110A	SMAJ110CA	SE	VE	110.0	122.00	135.00	1	177.0	2.26	5
SMAJ120	SMAJ120C	SF	VF	120.0	133.00	163.00	1	214.0	1.87	5
SMAJ120A	SMAJ120CA	SG	VG	120.0	133.00	147.00	1	193.0	2.07	5
SMAJ130	SMAJ130C	SH	VH	130.0	144.00	176.00	1	231.0	1.73	5
SMAJ130A	SMAJ130CA	SK	VK	130.0	144.00	159.00	1	209.0	1.91	5
SMAJ140	SMAJ140C	SA	VA	140.0	155.68	190.40	1	250.6	1.60	5
SMAJ140A	SMAJ140CA	SB	VB	140.0	155.00	171.00	1	226.8	1.76	5
SMAJ150	SMAJ150C	SL	VL	150.0	167.00	204.00	1	268.0	1.49	5
SMAJ150A	SMAJ150CA	SM	VM	150.0	167.00	185.00	1	243.0	1.65	5
SMAJ160	SMAJ160C	SN	VN	160.0	178.00	218.00	1	287.0	1.39	5
SMAJ160A	SMAJ160CA	SP	VP	160.0	178.00	197.00	1	259.0	1.54	5
SMAJ170	SMAJ170C	SQ	VQ	170.0	189.00	231.00	1	304.0	1.32	5
SMAJ170A	SMAJ170CA	SR	VR	170.0	189.00	209.00	1	275.0	1.45	5
SMAJ180	SMAJ180C	SS	VS	180.0	201.00	244.80	1	322.2	1.24	5
SMAJ180A	SMAJ180CA	ST	VT	180.0	201.00	220.00	1	291.6	1.37	5
SMAJ190	SMAJ190C	SU	VU	190.0	211.21	258.40	1	340.1	1.18	5
SMAJ190A	SMAJ190CA	SV	VV	190.0	211.00	232.00	1	307.8	1.30	5
SMAJ200A	SMAJ200CA	SW	VW	200.0	224.00	247.00	1	324.0	1.23	5
SMAJ220A	SMAJ220CA	SX	VX	220.0	246.00	272.00	1	356.0	1.12	5
SMAJ250A	SMAJ250CA	SZ	VZ	250.0	279.00	309.00	1	405.0	0.99	5
SMAJ300A	SMAJ300CA	DE	HE	300.0	335.00	371.00	1	486.0	0.82	5
SMAJ350A	SMAJ350CA	DG	HG	350.0	391.00	432.00	1	567.0	0.71	5
SMAJ400A	SMAJ400CA	DK	HK	400.0	447.00	494.00	1	648.0	0.62	5
SMAJ440A	SMAJ440CA	DM	HM	440.0	492.00	543.00	1	713.0	0.56	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
SMBJ Series 5.0 To 440 V 600W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 600W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AA / SMB
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.087	1.960	2.200
B	0.171	0.191	4.350	4.850
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.750	1.520
F	-	0.008	-	0.203
G	0.201	0.216	5.100	5.500
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

Surface Mount Transient Voltage Suppressors (TVS)
SMBJ Series 5.0 To 440 V 600W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMBJ5.0	SMBJ5.0C	KD	AD	5.0	6.40	7.30	10	9.6	62.50	800
SMBJ5.0A	SMBJ5.0CA	KE	AE	5.0	6.40	7.00	10	9.2	65.22	800
SMBJ6.0	SMBJ6.0C	KF	AF	6.0	6.67	8.15	10	11.4	52.63	800
SMBJ6.0A	SMBJ6.0CA	KG	AG	6.0	6.67	7.37	10	10.3	58.25	800
SMBJ6.5	SMBJ6.5C	KH	AH	6.5	7.22	8.82	10	12.3	48.78	500
SMBJ6.5A	SMBJ6.5CA	KK	AK	6.5	7.22	7.98	10	11.2	53.57	500
SMBJ7.0	SMBJ7.0C	KL	AL	7.0	7.78	9.51	10	13.3	45.11	200
SMBJ7.0A	SMBJ7.0CA	KM	AM	7.0	7.78	8.60	10	12.0	50.00	200
SMBJ7.5	SMBJ7.5C	KN	AN	7.5	8.33	10.20	1	14.3	41.96	100
SMBJ7.5A	SMBJ7.5CA	KP	AP	7.5	8.33	9.21	1	12.9	46.51	100
SMBJ8.0	SMBJ8.0C	KQ	AQ	8.0	8.89	10.90	1	15.0	40.00	50
SMBJ8.0A	SMBJ8.0CA	KR	AR	8.0	8.89	9.83	1	13.6	44.12	50
SMBJ8.5	SMBJ8.5C	KS	AS	8.5	9.44	11.50	1	15.9	37.74	10
SMBJ8.5A	SMBJ8.5CA	KT	AT	8.5	9.44	10.40	1	14.4	41.67	10
SMBJ9.0	SMBJ9.0C	KU	AU	9.0	10.00	12.20	1	16.9	35.50	5
SMBJ9.0A	SMBJ9.0CA	KV	AV	9.0	10.00	11.10	1	15.4	38.96	5
SMBJ10	SMBJ10C	KW	AA	10.0	11.10	13.60	1	18.8	31.91	5
SMBJ10A	SMBJ10CA	KX	AX	10.0	11.10	12.30	1	17.0	35.29	5
SMBJ11	SMBJ11C	KY	AY	11.0	12.20	14.90	1	20.1	29.85	5
SMBJ11A	SMBJ11CA	KZ	WZ	11.0	12.20	13.50	1	18.2	32.97	5
SMBJ12	SMBJ12C	LD	BD	12.0	13.30	16.30	1	22.0	27.27	5
SMBJ12A	SMBJ12CA	LE	BE	12.0	13.30	14.70	1	19.9	30.15	5
SMBJ13	SMBJ13C	LF	BF	13.0	14.40	17.60	1	23.8	25.21	5
SMBJ13A	SMBJ13CA	LG	BG	13.0	14.40	15.90	1	21.5	27.91	5
SMBJ14	SMBJ14C	LH	BH	14.0	15.60	19.10	1	25.8	23.26	5
SMBJ14A	SMBJ14CA	LK	BK	14.0	15.60	17.20	1	23.2	25.86	5
SMBJ15	SMBJ15C	LL	BL	15.0	16.70	20.40	1	26.9	22.30	5
SMBJ15A	SMBJ15CA	LM	BM	15.0	16.70	18.50	1	24.4	24.59	5
SMBJ16	SMBJ16C	LN	BN	16.0	17.80	21.80	1	28.8	20.83	5
SMBJ16A	SMBJ16CA	LP	BP	16.0	17.80	19.70	1	26.0	23.08	5
SMBJ17	SMBJ17C	LQ	BQ	17.0	18.90	23.10	1	30.5	19.67	5
SMBJ17A	SMBJ17CA	LR	BR	17.0	18.90	20.90	1	27.6	21.74	5
SMBJ18	SMBJ18C	LS	BS	18.0	20.00	24.40	1	32.2	18.63	5
SMBJ18A	SMBJ18CA	LT	BT	18.0	20.00	22.10	1	29.2	20.55	5
SMBJ19	SMBJ19C	LA	BA	19.0	21.13	25.76	1	34.0	17.64	5
SMBJ19A	SMBJ19CA	LB	BB	19.0	21.10	23.30	1	30.8	19.49	5
SMBJ20	SMBJ20C	LU	BU	20.0	22.20	27.10	1	35.8	16.67	5
SMBJ20A	SMBJ20CA	LV	BV	20.0	22.20	24.50	1	32.4	18.52	5
SMBJ22	SMBJ22C	LW	BW	22.0	24.40	29.80	1	39.4	15.23	5
SMBJ22A	SMBJ22CA	LX	BX	22.0	24.40	26.90	1	35.5	16.90	5
SMBJ24	SMBJ24C	LY	BY	24.0	26.70	32.60	1	43.0	13.95	5
SMBJ24A	SMBJ24CA	LZ	BZ	24.0	26.70	29.50	1	38.9	15.42	5
SMBJ26	SMBJ26C	MD	CD	26.0	28.90	35.30	1	46.6	12.88	5
SMBJ26A	SMBJ26CA	ME	CE	26.0	28.90	31.90	1	42.1	14.25	5
SMBJ28	SMBJ28C	MF	CF	28.0	31.10	38.00	1	50.0	12.00	5
SMBJ28A	SMBJ28CA	MG	CG	28.0	31.10	34.40	1	45.4	13.22	5
SMBJ30	SMBJ30C	MH	CH	30.0	33.30	40.70	1	53.5	11.21	5
SMBJ30A	SMBJ30CA	MK	CK	30.0	33.30	36.80	1	48.4	12.40	5
SMBJ33	SMBJ33C	ML	CL	33.0	36.70	44.90	1	59.0	10.17	5
SMBJ33A	SMBJ33CA	MM	CM	33.0	36.70	40.60	1	53.3	11.26	5
SMBJ36	SMBJ36C	MN	CN	36.0	40.00	48.90	1	64.3	9.33	5
SMBJ36A	SMBJ36CA	MP	CP	36.0	40.00	44.20	1	58.1	10.33	5
SMBJ40	SMBJ40C	MQ	CQ	40.0	44.40	54.30	1	71.4	8.40	5
SMBJ40A	SMBJ40CA	MR	CR	40.0	44.40	49.10	1	64.5	9.30	5
SMBJ43	SMBJ43C	MS	CS	43.0	47.80	58.40	1	76.7	7.82	5
SMBJ43A	SMBJ43CA	MT	CT	43.0	47.80	52.80	1	69.4	8.65	5

Surface Mount Transient Voltage Suppressors (TVS)
SMBJ Series 5.0 To 440 V 600W
Electrical Characteristics (T_A=25°C unless otherwise noted)

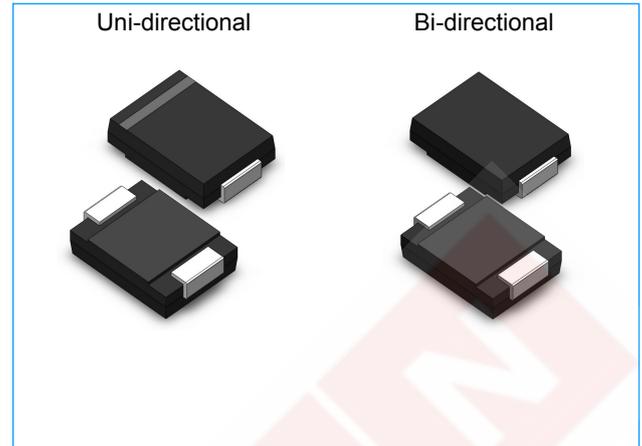
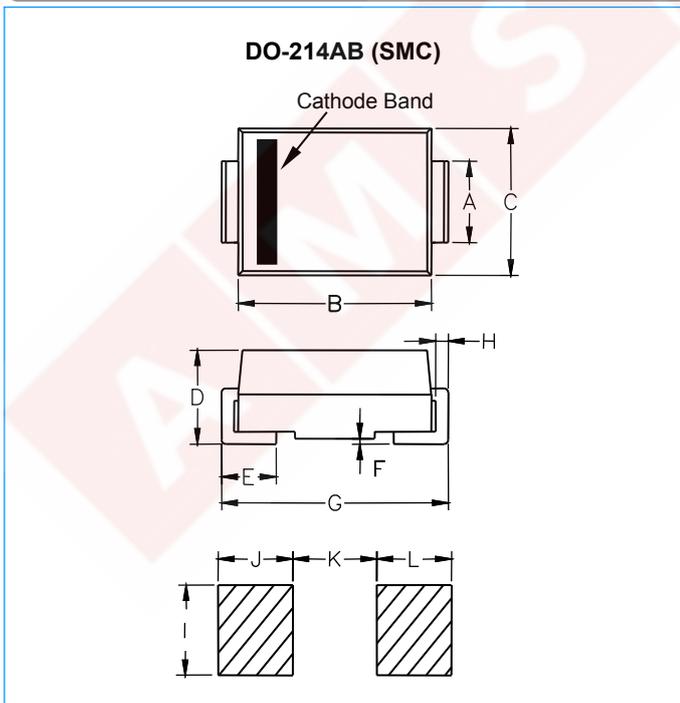
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMBJ45	SMBJ45C	MU	CU	45.0	50.00	61.10	1	80.3	7.47	5
SMBJ45A	SMBJ45CA	MV	CV	45.0	50.00	55.30	1	72.7	8.25	5
SMBJ48	SMBJ48C	MW	CW	48.0	53.30	65.10	1	85.5	7.02	5
SMBJ48A	SMBJ48CA	MX	CX	48.0	53.30	58.90	1	77.4	7.75	5
SMBJ51	SMBJ51C	MY	CY	51.0	56.70	69.30	1	91.1	6.59	5
SMBJ51A	SMBJ51CA	MZ	CZ	51.0	56.70	62.70	1	82.4	7.28	5
SMBJ54	SMBJ54C	ND	DD	54.0	60.00	73.30	1	96.3	6.23	5
SMBJ54A	SMBJ54CA	NE	DE	54.0	60.00	66.30	1	87.1	6.89	5
SMBJ58	SMBJ58C	NF	DF	58.0	64.40	78.70	1	103.0	5.83	5
SMBJ58A	SMBJ58CA	NG	DG	58.0	64.40	71.20	1	93.6	6.41	5
SMBJ60	SMBJ60C	NH	DH	60.0	66.70	81.50	1	107.0	5.61	5
SMBJ60A	SMBJ60CA	NK	DK	60.0	66.70	73.70	1	96.8	6.20	5
SMBJ64	SMBJ64C	NL	DL	64.0	71.10	86.90	1	114.0	5.26	5
SMBJ64A	SMBJ64CA	NM	DM	64.0	71.10	78.60	1	103.0	5.83	5
SMBJ70	SMBJ70C	NN	DN	70.0	77.80	95.10	1	125.0	4.80	5
SMBJ70A	SMBJ70CA	NP	DP	70.0	77.80	86.00	1	113.0	5.31	5
SMBJ75	SMBJ75C	NQ	DQ	75.0	83.30	102.00	1	134.0	4.48	5
SMBJ75A	SMBJ75CA	NR	DR	75.0	83.30	92.10	1	121.0	4.96	5
SMBJ78	SMBJ78C	NS	DS	78.0	86.70	106.00	1	139.0	4.32	5
SMBJ78A	SMBJ78CA	NT	DT	78.0	86.70	95.80	1	126.0	4.76	5
SMBJ80	SMBJ80C	NA	DA	80.0	88.96	108.80	1	143.2	4.19	5
SMBJ80A	SMBJ80CA	NB	DB	80.0	88.80	97.60	1	129.6	4.63	5
SMBJ85	SMBJ85C	NU	DU	85.0	94.40	115.00	1	151.0	3.97	5
SMBJ85A	SMBJ85CA	NV	DV	85.0	94.40	104.00	1	137.0	4.38	5
SMBJ90	SMBJ90C	NW	DW	90.0	100.00	122.00	1	160.0	3.75	5
SMBJ90A	SMBJ90CA	NX	DX	90.0	100.00	111.00	1	146.0	4.11	5
SMBJ100	SMBJ100C	NY	DY	100.0	111.00	136.00	1	179.0	3.35	5
SMBJ100A	SMBJ100CA	NZ	DZ	100.0	111.00	123.00	1	162.0	3.70	5
SMBJ110	SMBJ110C	PD	ED	110.0	122.00	149.00	1	196.0	3.06	5
SMBJ110A	SMBJ110CA	PE	EE	110.0	122.00	135.00	1	177.0	3.39	5
SMBJ120	SMBJ120C	PF	EF	120.0	133.00	163.00	1	214.0	2.80	5
SMBJ120A	SMBJ120CA	PG	EG	120.0	133.00	147.00	1	193.0	3.11	5
SMBJ130	SMBJ130C	PH	EH	130.0	144.00	176.00	1	231.0	2.60	5
SMBJ130A	SMBJ130CA	PK	EK	130.0	144.00	159.00	1	209.0	2.87	5
SMBJ140	SMBJ140C	PA	EA	140.0	155.68	190.40	1	250.6	2.39	5
SMBJ140A	SMBJ140CA	PB	EB	140.0	155.00	171.00	1	226.8	2.65	5
SMBJ150	SMBJ150C	PL	EL	150.0	167.00	204.00	1	268.0	2.24	5
SMBJ150A	SMBJ150CA	PM	EM	150.0	167.00	185.00	1	243.0	2.47	5
SMBJ160	SMBJ160C	PN	EN	160.0	178.00	218.00	1	287.0	2.09	5
SMBJ160A	SMBJ160CA	PP	EP	160.0	178.00	197.00	1	259.0	2.32	5
SMBJ170	SMBJ170C	PQ	EQ	170.0	189.00	231.00	1	304.0	1.97	5
SMBJ170A	SMBJ170CA	PR	ER	170.0	189.00	209.00	1	275.0	2.18	5
SMBJ180	SMBJ180C	PS	ES	180.0	201.00	244.80	1	322.2	1.86	5
SMBJ180A	SMBJ180CA	PT	ET	180.0	201.00	220.00	1	291.6	2.06	5
SMBJ190	SMBJ190C	PU	EU	190.0	211.21	258.40	1	340.1	1.76	5
SMBJ190A	SMBJ190CA	PV	EV	190.0	211.00	232.00	1	307.8	1.95	5
SMBJ200A	SMBJ200CA	PW	EW	200.0	224.00	247.00	1	324.0	1.85	5
SMBJ220A	SMBJ220CA	PX	EX	220.0	246.00	272.00	1	356.0	1.69	5
SMBJ250A	SMBJ250CA	PZ	EZ	250.0	279.00	309.00	1	405.0	1.48	5
SMBJ300A	SMBJ300CA	QE	FE	300.0	335.00	371.00	1	486.0	1.23	5
SMBJ350A	SMBJ350CA	QG	FG	350.0	391.00	432.00	1	567.0	1.06	5
SMBJ400A	SMBJ400CA	QK	FK	400.0	447.00	494.00	1	648.0	0.93	5
SMBJ440A	SMBJ440CA	QM	FM	440.0	492.00	543.00	1	713.0	0.84	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
SMCJ Series 5.0 To 440 V 1500W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 1500W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AB / SMC
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.860	3.160
B	0.260	0.280	6.520	7.020
C	0.220	0.245	5.520	6.150
D	0.079	0.103	1.980	2.590
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.305	0.320	7.640	8.020
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMCJ5.0	SMCJ5.0C	GDD	BDD	5.0	6.40	7.30	10	9.6	156.25	1000
SMCJ5.0A	SMCJ5.0CA	GDE	BDE	5.0	6.40	7.00	10	9.2	163.04	1000
SMCJ6.0	SMCJ6.0C	GDF	BDF	6.0	6.67	8.15	10	11.4	131.58	1000
SMCJ6.0A	SMCJ6.0CA	GDG	BDG	6.0	6.67	7.37	10	10.3	145.63	1000
SMCJ6.5	SMCJ6.5C	GDH	BDH	6.5	7.22	8.82	10	12.3	121.95	500
SMCJ6.5A	SMCJ6.5CA	GDK	BDK	6.5	7.22	7.98	10	11.2	133.93	500
SMCJ7.0	SMCJ7.0C	GDL	BDL	7.0	7.78	9.51	10	13.3	112.78	200
SMCJ7.0A	SMCJ7.0CA	GDM	BDM	7.0	7.78	8.60	10	12.0	125.00	200
SMCJ7.5	SMCJ7.5C	GDN	BDN	7.5	8.33	10.20	1	14.3	104.90	100
SMCJ7.5A	SMCJ7.5CA	GDP	BDP	7.5	8.33	9.21	1	12.9	116.28	100
SMCJ8.0	SMCJ8.0C	GDQ	BDQ	8.0	8.89	10.90	1	15.0	100.00	50
SMCJ8.0A	SMCJ8.0CA	GDR	BDR	8.0	8.89	9.83	1	13.6	110.29	50
SMCJ8.5	SMCJ8.5C	GDS	BDS	8.5	9.44	11.50	1	15.9	94.34	20
SMCJ8.5A	SMCJ8.5CA	GDT	BDT	8.5	9.44	10.40	1	14.4	104.17	20
SMCJ9.0	SMCJ9.0C	GDU	BDU	9.0	10.00	12.20	1	16.9	88.76	10
SMCJ9.0A	SMCJ9.0CA	GDV	BDV	9.0	10.00	11.10	1	15.4	97.40	10
SMCJ10	SMCJ10C	GDW	BDW	10.0	11.10	13.60	1	18.8	79.79	5
SMCJ10A	SMCJ10CA	GDX	BDX	10.0	11.10	12.30	1	17.0	88.24	5
SMCJ11	SMCJ11C	GDY	BDY	11.0	12.20	14.90	1	20.1	74.63	5
SMCJ11A	SMCJ11CA	GDZ	BDZ	11.0	12.20	13.50	1	18.2	82.42	5
SMCJ12	SMCJ12C	GED	BED	12.0	13.30	16.30	1	22.0	68.18	5
SMCJ12A	SMCJ12CA	GEE	BEE	12.0	13.30	14.70	1	19.9	75.38	5
SMCJ13	SMCJ13C	GEF	BEF	13.0	14.40	17.60	1	23.8	63.03	5
SMCJ13A	SMCJ13CA	GEG	BEG	13.0	14.40	15.90	1	21.5	69.77	5
SMCJ14	SMCJ14C	GEH	BEH	14.0	15.60	19.10	1	25.8	58.14	5
SMCJ14A	SMCJ14CA	GEK	BEK	14.0	15.60	17.20	1	23.2	64.66	5
SMCJ15	SMCJ15C	GEL	BEL	15.0	16.70	20.40	1	26.9	55.76	5
SMCJ15A	SMCJ15CA	GEM	BEM	15.0	16.70	18.50	1	24.4	61.48	5
SMCJ16	SMCJ16C	GEN	BEN	16.0	17.80	21.80	1	28.8	52.08	5
SMCJ16A	SMCJ16CA	GEP	BEP	16.0	17.80	19.70	1	26.0	57.69	5
SMCJ17	SMCJ17C	GEQ	BEQ	17.0	18.90	23.10	1	30.5	49.18	5
SMCJ17A	SMCJ17CA	GER	BER	17.0	18.90	20.90	1	27.6	54.35	5
SMCJ18	SMCJ18C	GES	BES	18.0	20.00	24.40	1	32.2	46.58	5
SMCJ18A	SMCJ18CA	GET	BET	18.0	20.00	22.10	1	29.2	51.37	5
SMCJ19	SMCJ19C	GEA	BEA	19.0	21.13	25.76	1	34.0	44.10	5
SMCJ19A	SMCJ19CA	GEB	BEB	19.0	21.10	23.30	1	30.8	48.73	5
SMCJ20	SMCJ20C	GEU	BEU	20.0	22.20	27.10	1	35.8	41.90	5
SMCJ20A	SMCJ20CA	GEV	BEV	20.0	22.20	24.50	1	32.4	46.30	5
SMCJ22	SMCJ22C	GEW	BEW	22.0	24.40	29.80	1	39.4	38.07	5
SMCJ22A	SMCJ22CA	GEX	BEX	22.0	24.40	26.90	1	35.5	42.25	5
SMCJ24	SMCJ24C	GEY	BEY	24.0	26.70	32.60	1	43.0	34.88	5
SMCJ24A	SMCJ24CA	GEZ	BEZ	24.0	26.70	29.50	1	38.9	38.56	5
SMCJ26	SMCJ26C	GFD	BFD	26.0	28.90	35.30	1	46.6	32.19	5
SMCJ26A	SMCJ26CA	GFE	BFE	26.0	28.90	31.90	1	42.1	35.63	5
SMCJ28	SMCJ28C	GFF	BFF	28.0	31.10	38.00	1	50.0	30.00	5
SMCJ28A	SMCJ28CA	GFG	BFG	28.0	31.10	34.40	1	45.4	33.04	5
SMCJ30	SMCJ30C	GFH	BFH	30.0	33.30	40.70	1	53.5	28.04	5
SMCJ30A	SMCJ30CA	GFK	BFK	30.0	33.30	36.80	1	48.4	30.99	5
SMCJ33	SMCJ33C	GFL	BFL	33.0	36.70	44.90	1	59.0	25.42	5
SMCJ33A	SMCJ33CA	GFM	BFM	33.0	36.70	40.60	1	53.3	28.14	5
SMCJ36	SMCJ36C	GFN	BFN	36.0	40.00	48.90	1	64.3	23.33	5
SMCJ36A	SMCJ36CA	GFP	BFP	36.0	40.00	44.20	1	58.1	25.82	5
SMCJ40	SMCJ40C	GFQ	BFQ	40.0	44.40	54.30	1	71.4	21.01	5
SMCJ40A	SMCJ40CA	GFR	BFR	40.0	44.40	49.10	1	64.5	23.26	5
SMCJ43	SMCJ43C	GFS	BFS	43.0	47.80	58.40	1	76.7	19.56	5
SMCJ43A	SMCJ43CA	GFT	BFT	43.0	47.80	52.80	1	69.4	21.61	5

Surface Mount Transient Voltage Suppressors (TVS)
SMCJ Series 5.0 To 440 V 1500W
Electrical Characteristics (T_A=25°C unless otherwise noted)

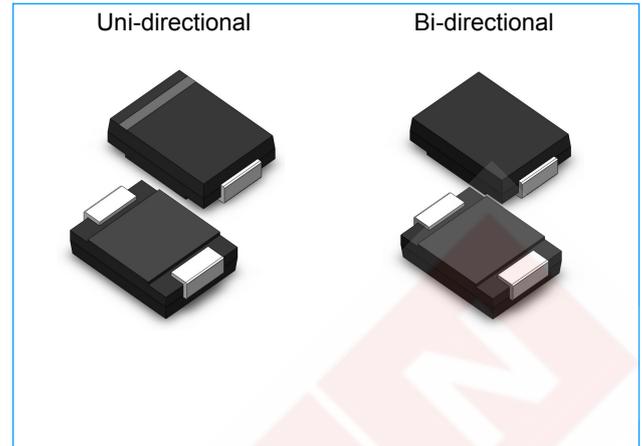
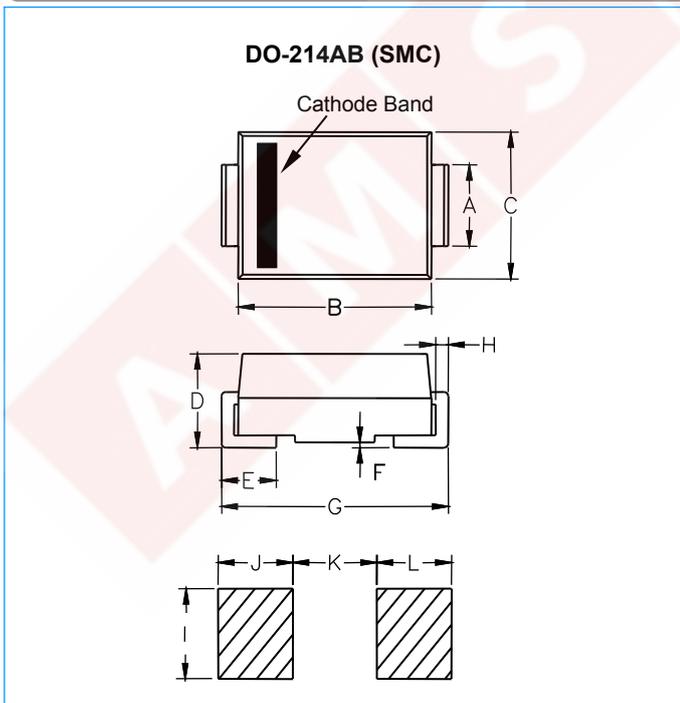
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMCJ45	SMCJ45C	GFU	BFU	45.0	50.00	61.10	1	80.3	18.68	5
SMCJ45A	SMCJ45CA	GFV	BFV	45.0	50.00	55.30	1	72.7	20.63	5
SMCJ48	SMCJ48C	GFW	BFW	48.0	53.30	65.10	1	85.5	17.54	5
SMCJ48A	SMCJ48CA	GFX	BFX	48.0	53.30	58.90	1	77.4	19.38	5
SMCJ51	SMCJ51C	GFY	BFY	51.0	56.70	69.30	1	91.1	16.47	5
SMCJ51A	SMCJ51CA	GFZ	BFZ	51.0	56.70	62.70	1	82.4	18.20	5
SMCJ54	SMCJ54C	GGD	BGD	54.0	60.00	73.30	1	96.3	15.58	5
SMCJ54A	SMCJ54CA	GGE	BGE	54.0	60.00	66.30	1	87.1	17.22	5
SMCJ58	SMCJ58C	GGF	BGF	58.0	64.40	78.70	1	103.0	14.56	5
SMCJ58A	SMCJ58CA	GGG	BGG	58.0	64.40	71.20	1	93.6	16.03	5
SMCJ60	SMCJ60C	GGH	BGH	60.0	66.70	81.50	1	107.0	14.02	5
SMCJ60A	SMCJ60CA	G GK	B GK	60.0	66.70	73.70	1	96.8	15.50	5
SMCJ64	SMCJ64C	GGL	BGL	64.0	71.10	86.90	1	114.0	13.16	5
SMCJ64A	SMCJ64CA	GGM	BGM	64.0	71.10	78.60	1	103.0	14.56	5
SMCJ70	SMCJ70C	GGN	BGN	70.0	77.80	95.10	1	125.0	12.00	5
SMCJ70A	SMCJ70CA	G GP	B GP	70.0	77.80	86.00	1	113.0	13.27	5
SMCJ75	SMCJ75C	GGQ	BGQ	75.0	83.30	102.00	1	134.0	11.19	5
SMCJ75A	SMCJ75CA	G GR	B GR	75.0	83.30	92.10	1	121.0	12.40	5
SMCJ78	SMCJ78C	GG S	B GS	78.0	86.70	106.00	1	139.0	10.79	5
SMCJ78A	SMCJ78CA	G GT	B GT	78.0	86.70	95.80	1	126.0	11.90	5
SMCJ80	SMCJ80C	G GA	B GA	80.0	88.96	108.80	1	143.2	10.47	5
SMCJ80A	SMCJ80CA	G GB	B GB	80.0	88.80	97.60	1	129.6	11.57	5
SMCJ85	SMCJ85C	G GU	B GU	85.0	94.40	115.00	1	151.0	9.93	5
SMCJ85A	SMCJ85CA	G GV	B GV	85.0	94.40	104.00	1	137.0	10.95	5
SMCJ90	SMCJ90C	G GW	B GW	90.0	100.00	122.00	1	160.0	9.38	5
SMCJ90A	SMCJ90CA	G GX	B GX	90.0	100.00	111.00	1	146.0	10.27	5
SMCJ100	SMCJ100C	G GY	B GY	100.0	111.00	136.00	1	179.0	8.38	5
SMCJ100A	SMCJ100CA	G GZ	B GZ	100.0	111.00	123.00	1	162.0	9.26	5
SMCJ110	SMCJ110C	G HD	B HD	110.0	122.00	149.00	1	196.0	7.65	5
SMCJ110A	SMCJ110CA	G HE	B HE	110.0	122.00	135.00	1	177.0	8.47	5
SMCJ120	SMCJ120C	G HF	B HF	120.0	133.00	163.00	1	214.0	7.01	5
SMCJ120A	SMCJ120CA	G HG	B HG	120.0	133.00	147.00	1	193.0	7.77	5
SMCJ130	SMCJ130C	G HH	B HH	130.0	144.00	176.00	1	231.0	6.49	5
SMCJ130A	SMCJ130CA	G HK	B HK	130.0	144.00	159.00	1	209.0	7.18	5
SMCJ140	SMCJ140C	G HA	B HA	140.0	155.68	190.40	1	250.6	5.99	5
SMCJ140A	SMCJ140CA	G HB	B HB	140.0	155.00	171.00	1	226.8	6.61	5
SMCJ150	SMCJ150C	G HL	B HL	150.0	167.00	204.00	1	268.0	5.60	5
SMCJ150A	SMCJ150CA	G HM	B HM	150.0	167.00	185.00	1	243.0	6.17	5
SMCJ160	SMCJ160C	G HN	B HN	160.0	178.00	218.00	1	287.0	5.23	5
SMCJ160A	SMCJ160CA	G HP	B HP	160.0	178.00	197.00	1	259.0	5.79	5
SMCJ170	SMCJ170C	G HQ	B HQ	170.0	189.00	231.00	1	304.0	4.93	5
SMCJ170A	SMCJ170CA	G HR	B HR	170.0	189.00	209.00	1	275.0	5.45	5
SMCJ180	SMCJ180C	G HS	B HS	180.0	201.00	244.80	1	322.2	4.66	5
SMCJ180A	SMCJ180CA	G HT	B HT	180.0	201.00	220.00	1	291.6	5.14	5
SMCJ190	SMCJ190C	G HU	B HU	190.0	211.21	258.40	1	340.1	4.41	5
SMCJ190A	SMCJ190CA	G HV	B HV	190.0	211.00	232.00	1	307.8	4.87	5
SMCJ200A	SMCJ200CA	G HW	B HW	200.0	224.00	247.00	1	324.0	4.60	5
SMCJ220A	SMCJ220CA	G HX	B HX	220.0	246.00	272.00	1	356.0	4.20	5
SMCJ250A	SMCJ250CA	G HZ	B HZ	250.0	279.00	309.00	1	405.0	3.70	5
SMCJ300A	SMCJ300CA	G JE	B JE	300.0	335.00	371.00	1	486.0	3.10	5
SMCJ350A	SMCJ350CA	G JG	B JG	350.0	391.00	432.00	1	567.0	2.60	5
SMCJ400A	SMCJ400CA	G JK	B JK	400.0	447.00	494.00	1	648.0	2.30	5
SMCJ440A	SMCJ440CA	G JM	B JM	440.0	492.00	543.00	1	713.0	2.10	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
SMDJ Series 5.0 To 440 V 3000W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 3000W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AB (SMC)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.860	3.160
B	0.260	0.280	6.520	7.020
C	0.220	0.245	5.520	6.150
D	0.079	0.103	1.980	2.590
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.305	0.320	7.640	8.020
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Surface Mount Transient Voltage Suppressors (TVS)
SMDJ Series 5.0 To 440 V 3000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V)		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMDJ5.0	SMDJ5.0C	RDD	DDD	5.0	6.40	7.30	10	9.6	312.50	1000
SMDJ5.0A	SMDJ5.0CA	RDE	DDE	5.0	6.40	7.00	10	9.2	326.09	1000
SMDJ6.0	SMDJ6.0C	RDF	DDF	6.0	6.67	8.15	10	11.4	263.16	1000
SMDJ6.0A	SMDJ6.0CA	RDG	DDG	6.0	6.67	7.37	10	10.3	291.26	1000
SMDJ6.5	SMDJ6.5C	RDH	DDH	6.5	7.22	8.82	10	12.3	243.90	500
SMDJ6.5A	SMDJ6.5CA	RDK	DDK	6.5	7.22	7.98	10	11.2	267.86	500
SMDJ7.0	SMDJ7.0C	RDL	DDL	7.0	7.78	9.51	10	13.3	225.56	200
SMDJ7.0A	SMDJ7.0CA	PDM	DDM	7.0	7.78	8.60	10	12.0	250.00	200
SMDJ7.5	SMDJ7.5C	PDN	DDN	7.5	8.33	10.20	1	14.3	209.79	100
SMDJ7.5A	SMDJ7.5CA	PDP	DDP	7.5	8.33	9.21	1	12.9	232.56	100
SMDJ8.0	SMDJ8.0C	PDQ	DDQ	8.0	8.89	10.90	1	15.0	200.00	50
SMDJ8.0A	SMDJ8.0CA	PDR	DDR	8.0	8.89	9.83	1	13.6	220.59	50
SMDJ8.5	SMDJ8.5C	PDS	DDS	8.5	9.44	11.50	1	15.9	188.68	25
SMDJ8.5A	SMDJ8.5CA	PDT	DDT	8.5	9.44	10.40	1	14.4	208.33	25
SMDJ9.0	SMDJ9.0C	PDU	DDU	9.0	10.00	12.20	1	16.9	177.51	10
SMDJ9.0A	SMDJ9.0CA	PDV	DDV	9.0	10.00	11.10	1	15.4	194.81	10
SMDJ10	SMDJ10C	PDW	DDW	10.0	11.10	13.60	1	18.8	159.57	5
SMDJ10A	SMDJ10CA	PDX	DDX	10.0	11.10	12.30	1	17.0	176.47	5
SMDJ11	SMDJ11C	PDY	DDY	11.0	12.20	14.90	1	20.1	149.25	5
SMDJ11A	SMDJ11CA	PDZ	DDZ	11.0	12.20	13.50	1	18.2	164.84	5
SMDJ12	SMDJ12C	PED	DED	12.0	13.30	16.30	1	22.0	136.36	5
SMDJ12A	SMDJ12CA	PEE	DEE	12.0	13.30	14.70	1	19.9	150.75	5
SMDJ13	SMDJ13C	PEF	DEF	13.0	14.40	17.60	1	23.8	126.05	5
SMDJ13A	SMDJ13CA	PEG	DEG	13.0	14.40	15.90	1	21.5	139.53	5
SMDJ14	SMDJ14C	PEH	DEH	14.0	15.60	19.10	1	25.8	116.28	5
SMDJ14A	SMDJ14CA	PEK	DEK	14.0	15.60	17.20	1	23.2	129.31	5
SMDJ15	SMDJ15C	PEL	DEL	15.0	16.70	20.40	1	26.9	111.52	5
SMDJ15A	SMDJ15CA	PEM	DEM	15.0	16.70	18.50	1	24.4	122.95	5
SMDJ16	SMDJ16C	PEN	DEN	16.0	17.80	21.80	1	28.8	104.17	5
SMDJ16A	SMDJ16CA	PEP	DEP	16.0	17.80	19.70	1	26.0	115.38	5
SMDJ17	SMDJ17C	PEQ	DEQ	17.0	18.90	23.10	1	30.5	98.36	5
SMDJ17A	SMDJ17CA	PER	DER	17.0	18.90	20.90	1	27.6	108.70	5
SMDJ18	SMDJ18C	PES	DES	18.0	20.00	24.40	1	32.2	93.17	5
SMDJ18A	SMDJ18CA	PET	DET	18.0	20.00	22.10	1	29.2	102.74	5
SMDJ19	SMDJ19C	PEA	DEA	19.0	21.13	25.76	1	34.0	88.21	5
SMDJ19A	SMDJ19CA	PEB	DEB	19.0	21.10	23.30	1	30.8	97.47	5
SMDJ20	SMDJ20C	PEU	DEU	20.0	22.20	27.10	1	35.8	83.80	5
SMDJ20A	SMDJ20CA	PEV	DEV	20.0	22.20	24.50	1	32.4	92.59	5
SMDJ22	SMDJ22C	PEW	DEW	22.0	24.40	29.80	1	39.4	76.14	5
SMDJ22A	SMDJ22CA	PEX	DEX	22.0	24.40	26.90	1	35.5	84.51	5
SMDJ24	SMDJ24C	PEY	DEY	24.0	26.70	32.60	1	43.0	69.77	5
SMDJ24A	SMDJ24CA	PEZ	DEZ	24.0	26.70	29.50	1	38.9	77.12	5
SMDJ26	SMDJ26C	PFD	DFD	26.0	28.90	35.30	1	46.6	64.38	5
SMDJ26A	SMDJ26CA	PFE	DFE	26.0	28.90	31.90	1	42.1	71.26	5
SMDJ28	SMDJ28C	PFF	DFF	28.0	31.10	38.00	1	50.0	60.00	5
SMDJ28A	SMDJ28CA	PFG	DFG	28.0	31.10	34.40	1	45.4	66.08	5
SMDJ30	SMDJ30C	PFH	DFH	30.0	33.30	40.70	1	53.5	56.07	5
SMDJ30A	SMDJ30CA	PFK	DFK	30.0	33.30	36.80	1	48.4	61.98	5
SMDJ33	SMDJ33C	PFL	DFL	33.0	36.70	44.90	1	59.0	50.85	5
SMDJ33A	SMDJ33CA	PFM	DFM	33.0	36.70	40.60	1	53.3	56.29	5
SMDJ36	SMDJ36C	PFN	DFN	36.0	40.00	48.90	1	64.3	46.66	5
SMDJ36A	SMDJ36CA	PFP	DFP	36.0	40.00	44.20	1	58.1	51.64	5
SMDJ40	SMDJ40C	PFQ	DFQ	40.0	44.40	54.30	1	71.4	42.02	5
SMDJ40A	SMDJ40CA	PFR	DFR	40.0	44.40	49.10	1	64.5	46.51	5
SMDJ43	SMDJ43C	PFS	DFS	43.0	47.80	58.40	1	76.7	39.11	5
SMDJ43A	SMDJ43CA	PFT	DFT	43.0	47.80	52.80	1	69.4	43.23	5

Electrical Characteristics (T_A=25°C unless otherwise noted)

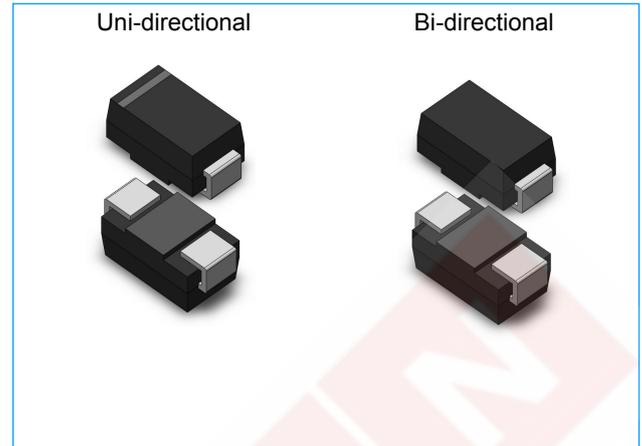
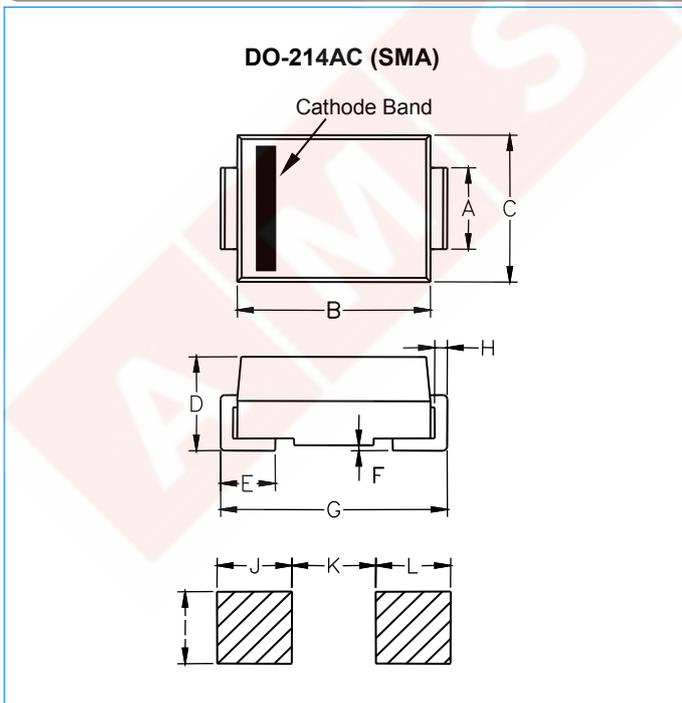
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
SMDJ45	SMDJ45C	PFU	DFU	45.0	50.00	61.10	1	80.3	37.36	5
SMDJ45A	SMDJ45CA	PFV	DFV	45.0	50.00	55.30	1	72.7	41.27	5
SMDJ48	SMDJ48C	PFW	DFW	48.0	53.30	65.10	1	85.5	35.09	5
SMDJ48A	SMDJ48CA	PFX	DFX	48.0	53.30	58.90	1	77.4	38.76	5
SMDJ51	SMDJ51C	PFY	DFY	51.0	56.70	69.30	1	91.1	32.93	5
SMDJ51A	SMDJ51CA	PFZ	DFZ	51.0	56.70	62.70	1	82.4	36.41	5
SMDJ54	SMDJ54C	RGD	DGD	54.0	60.00	73.30	1	96.3	31.15	5
SMDJ54A	SMDJ54CA	RGE	DGE	54.0	60.00	66.30	1	87.1	34.44	5
SMDJ58	SMDJ58C	RGF	DGF	58.0	64.40	78.70	1	103.0	29.13	5
SMDJ58A	SMDJ58CA	PGG	DGG	58.0	64.40	71.20	1	93.6	32.05	5
SMDJ60	SMDJ60C	RGH	DGH	60.0	66.70	81.50	1	107.0	28.04	5
SMDJ60A	SMDJ60CA	PGK	DGK	60.0	66.70	73.70	1	96.8	30.99	5
SMDJ64	SMDJ64C	PGL	DGL	64.0	71.10	86.90	1	114.0	26.32	5
SMDJ64A	SMDJ64CA	PGM	DGM	64.0	71.10	78.60	1	103.0	29.13	5
SMDJ70	SMDJ70C	PGN	DGN	70.0	77.80	95.10	1	125.0	24.00	5
SMDJ70A	SMDJ70CA	PGP	DGP	70.0	77.80	86.00	1	113.0	26.55	5
SMDJ75	SMDJ75C	PGQ	DGQ	75.0	83.30	102.00	1	134.0	22.39	5
SMDJ75A	SMDJ75CA	PGR	DGR	75.0	83.30	92.10	1	121.0	24.79	5
SMDJ78	SMDJ78C	PGS	DGS	78.0	86.70	106.00	1	139.0	21.58	5
SMDJ78A	SMDJ78CA	PGT	DGT	78.0	86.70	95.80	1	126.0	23.81	5
SMDJ80	SMDJ80C	PGA	DGA	80.0	88.96	108.80	1	143.2	20.95	5
SMDJ80A	SMDJ80CA	PGB	DGB	80.0	88.80	97.60	1	129.6	23.15	5
SMDJ85	SMDJ85C	PGU	DGU	85.0	94.40	115.00	1	151.0	19.87	5
SMDJ85A	SMDJ85CA	PGV	DGV	85.0	94.40	104.00	1	137.0	21.90	5
SMDJ90	SMDJ90C	PGW	DGW	90.0	100.00	122.00	1	160.0	18.75	5
SMDJ90A	SMDJ90CA	PGX	DGX	90.0	100.00	111.00	1	146.0	20.55	5
SMDJ100	SMDJ100C	PGY	DGY	100.0	111.00	136.00	1	179.0	16.76	5
SMDJ100A	SMDJ100CA	PGZ	DGZ	100.0	111.00	123.00	1	162.0	18.52	5
SMDJ110	SMDJ110C	PHD	DHD	110.0	122.00	149.00	1	196.0	15.31	5
SMDJ110A	SMDJ110CA	PHE	DHE	110.0	122.00	135.00	1	177.0	16.95	5
SMDJ120	SMDJ120C	PHF	DHF	120.0	133.00	163.00	1	214.0	14.02	5
SMDJ120A	SMDJ120CA	PHG	DHG	120.0	133.00	147.00	1	193.0	15.54	5
SMDJ130	SMDJ130C	PHH	DHH	130.0	144.00	176.00	1	231.0	12.99	5
SMDJ130A	SMDJ130CA	PHK	DHK	130.0	144.00	159.00	1	209.0	14.35	5
SMDJ140	SMDJ140C	PHA	DHA	140.0	155.68	190.40	1	250.6	11.97	5
SMDJ140A	SMDJ140CA	PHB	DHB	140.0	155.00	171.00	1	226.8	13.23	5
SMDJ150	SMDJ150C	PHL	DHL	150.0	167.00	204.00	1	268.0	11.19	5
SMDJ150A	SMDJ150CA	PHM	DHM	150.0	167.00	185.00	1	243.0	12.35	5
SMDJ160	SMDJ160C	PHN	DHN	160.0	178.00	218.00	1	287.0	10.45	5
SMDJ160A	SMDJ160CA	PHP	DHP	160.0	178.00	197.00	1	259.0	11.58	5
SMDJ170	SMDJ170C	PHQ	DHQ	170.0	189.00	231.00	1	304.0	9.87	5
SMDJ170A	SMDJ170CA	PHR	DHR	170.0	189.00	209.00	1	275.0	10.91	5
SMDJ180	SMDJ180C	PHS	DHS	180.0	201.00	244.80	1	322.2	9.31	5
SMDJ180A	SMDJ180CA	PHT	DHT	180.0	201.00	220.00	1	291.6	10.29	5
SMDJ190	SMDJ190C	PHU	DHU	190.0	211.21	258.40	1	340.1	8.82	5
SMDJ190A	SMDJ190CA	PHV	DHV	190.0	211.00	232.00	1	307.8	9.75	5
SMDJ200A	SMDJ200CA	PHW	DHW	200.0	224.00	247.00	1	324.0	9.26	5
SMDJ220A	SMDJ220CA	PHX	DHX	220.0	246.00	272.00	1	356.0	8.43	5
SMDJ250A	SMDJ250CA	PHZ	DHZ	250.0	279.00	309.00	1	405.0	7.41	5
SMDJ300A	SMDJ300CA	PJE	DJE	300.0	335.00	371.00	1	486.0	6.17	5
SMDJ350A	SMDJ350CA	PJG	DJG	350.0	391.00	432.00	1	567.0	5.29	5
SMDJ400A	SMDJ400CA	PJK	DJK	400.0	447.00	494.00	1	648.0	4.63	5
SMDJ440A	SMDJ440CA	PJM	DJM	440.0	492.00	543.00	1	713.0	4.21	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
P4SMA Series 6.8 To 600 V 400W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 400W Peak power capability at 10 × 1000µs waveform
- ◆ Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}\text{C} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AC (SMA)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.064	1.230	1.630
B	0.162	0.179	4.10	4.550
C	0.099	0.109	2.510	2.760
D	0.077	0.089	1.960	2.260
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.192	0.206	4.87	5.220
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-

Surface Mount Transient Voltage Suppressors (TVS)
P4SMA Series 6.8 To 600 V 400W
Electrical Characteristics (T_A=25°C unless otherwise noted)

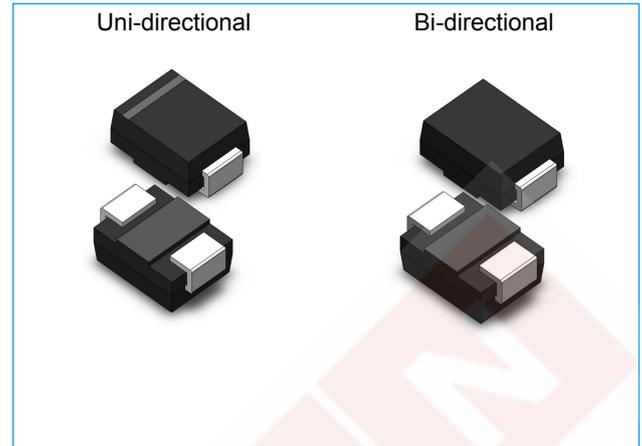
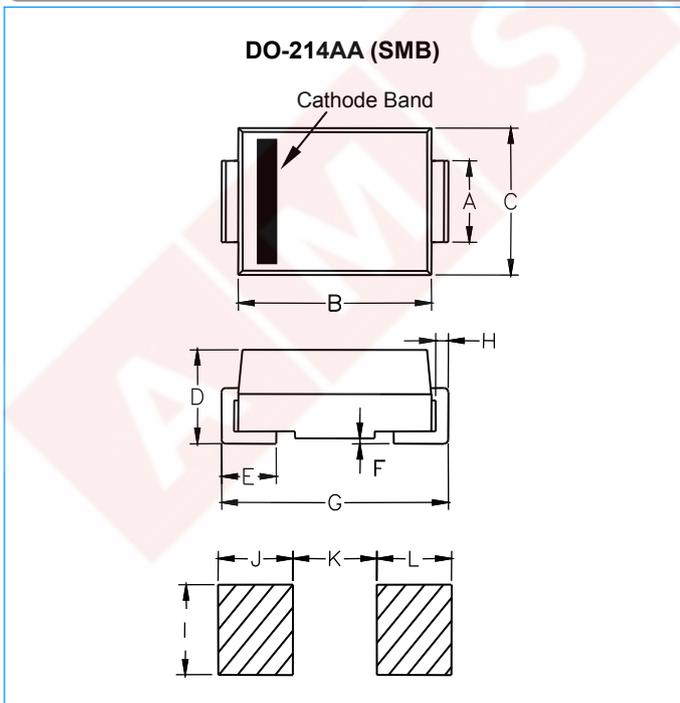
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
P4SMA6.8A	P4SMA6.8CA	6V8A	6V8C	5.8	6.46	7.14	10	10.5	38.10	1000
P4SMA7.5A	P4SMA7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	35.40	500
P4SMA8.2A	P4SMA8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	33.06	200
P4SMA9.1A	P4SMA9.1CA	9V1A	9V1C	7.8	8.65	9.56	1	13.4	29.85	50
P4SMA10A	P4SMA10CA	10A	10C	8.6	9.50	10.50	1	14.5	27.59	10
P4SMA11A	P4SMA11CA	11A	11C	9.4	10.45	11.55	1	15.6	25.64	5
P4SMA12A	P4SMA12CA	12A	12C	10.2	11.40	12.60	1	16.7	23.95	5
P4SMA13A	P4SMA13CA	13A	13C	11.1	12.35	13.65	1	18.2	21.98	5
P4SMA15A	P4SMA15CA	15A	15C	12.8	14.25	15.75	1	21.2	18.87	5
P4SMA16A	P4SMA16CA	16A	16C	13.6	15.20	16.80	1	22.5	17.78	5
P4SMA18A	P4SMA18CA	18A	18C	15.3	17.10	18.90	1	25.2	15.87	5
P4SMA20A	P4SMA20CA	20A	20C	17.1	19.00	21.00	1	27.7	14.44	5
P4SMA22A	P4SMA22CA	22A	22C	18.8	20.90	23.10	1	30.6	13.07	5
P4SMA24A	P4SMA24CA	24A	24C	20.5	22.80	25.20	1	33.2	12.05	5
P4SMA27A	P4SMA27CA	27A	27C	23.1	25.65	28.35	1	37.5	10.67	5
P4SMA30A	P4SMA30CA	30A	30C	25.6	28.50	31.50	1	41.4	9.66	5
P4SMA33A	P4SMA33CA	33A	33C	28.2	31.35	34.65	1	45.7	8.75	5
P4SMA36A	P4SMA36CA	36A	36C	30.8	34.20	37.80	1	49.9	8.02	5
P4SMA39A	P4SMA39CA	39A	39C	33.3	37.05	40.95	1	53.9	7.42	5
P4SMA43A	P4SMA43CA	43A	43C	36.8	40.85	45.15	1	59.3	6.75	5
P4SMA47A	P4SMA47CA	47A	47C	40.2	44.65	49.35	1	64.8	6.17	5
P4SMA51A	P4SMA51CA	51A	51C	43.6	48.45	53.55	1	70.1	5.71	5
P4SMA56A	P4SMA56CA	56A	56C	47.8	53.20	58.80	1	77.0	5.19	5
P4SMA62A	P4SMA62CA	62A	62C	53.0	58.90	65.10	1	85.0	4.71	5
P4SMA68A	P4SMA68CA	68A	68C	58.1	64.60	71.40	1	92.0	4.35	5
P4SMA75A	P4SMA75CA	75A	75C	64.1	71.25	78.75	1	103.0	3.88	5
P4SMA82A	P4SMA82CA	82A	82C	70.1	77.90	86.10	1	113.0	3.54	5
P4SMA91A	P4SMA91CA	91A	91C	77.8	86.45	95.55	1	125.0	3.20	5
P4SMA100A	P4SMA100CA	100A	100C	85.5	95.00	105.00	1	137.0	2.92	5
P4SMA110A	P4SMA110CA	110A	110C	94.0	104.50	115.50	1	152.0	2.63	5
P4SMA120A	P4SMA120CA	120A	120C	102.0	114.00	126.00	1	165.0	2.42	5
P4SMA130A	P4SMA130CA	130A	130C	111.0	123.50	136.50	1	179.0	2.23	5
P4SMA150A	P4SMA150CA	150A	150C	128.0	142.50	157.50	1	207.0	1.93	5
P4SMA160A	P4SMA160CA	160A	160C	136.0	152.00	168.00	1	219.0	1.83	5
P4SMA170A	P4SMA170CA	170A	170C	145.0	161.50	178.50	1	234.0	1.71	5
P4SMA180A	P4SMA180CA	180A	180C	154.0	171.00	189.00	1	246.0	1.63	5
P4SMA200A	P4SMA200CA	200A	200C	171.0	190.00	210.00	1	274.0	1.46	5
P4SMA220A	P4SMA220CA	220A	220C	185.0	209.00	231.00	1	328.0	1.22	5
P4SMA250A	P4SMA250CA	250A	250C	214.0	237.50	262.50	1	344.0	1.16	5
P4SMA300A	P4SMA300CA	300A	300C	256.0	285.00	315.00	1	414.0	0.97	5
P4SMA350A	P4SMA350CA	350A	350C	299.3	332.50	367.50	1	482.0	0.83	5
P4SMA380A	P4SMA380CA	380A	380C	324.9	361.00	399.00	1	524.4	0.76	5
P4SMA400A	P4SMA400CA	400A	400C	342.0	380.00	420.00	1	552.0	0.72	5
P4SMA440A	P4SMA440CA	440A	440C	376.2	418.00	462.00	1	607.2	0.66	5
P4SMA500A	P4SMA500CA	500A	500C	427.5	475.00	525.00	1	690.0	0.58	5
P4SMA520A	P4SMA520CA	520A	520C	444.6	494.00	546.00	1	717.6	0.56	5
P4SMA550A	P4SMA550CA	550A	550C	470.3	522.50	577.50	1	759.0	0.53	5
P4SMA600A	P4SMA600CA	600A	600C	513.0	570.00	630.00	1	828.0	0.48	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
P6SMBSeries 6.8 To 600 V 600W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 600W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AA (SMB)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.087	1.960	2.200
B	0.171	0.191	4.350	4.850
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.750	1.520
F	-	0.008	-	0.203
G	0.201	0.216	5.100	5.500
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

Electrical Characteristics (T_A=25°C unless otherwise noted)

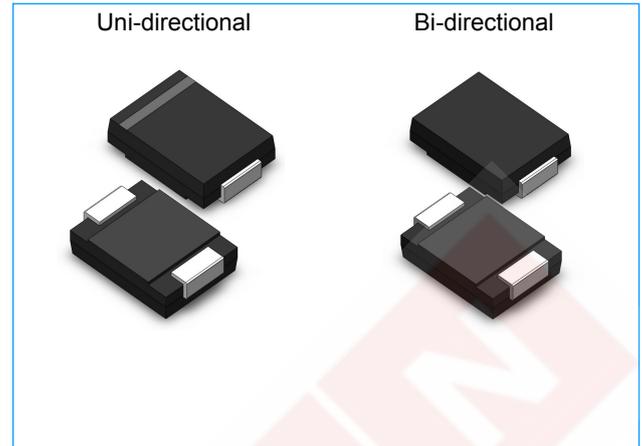
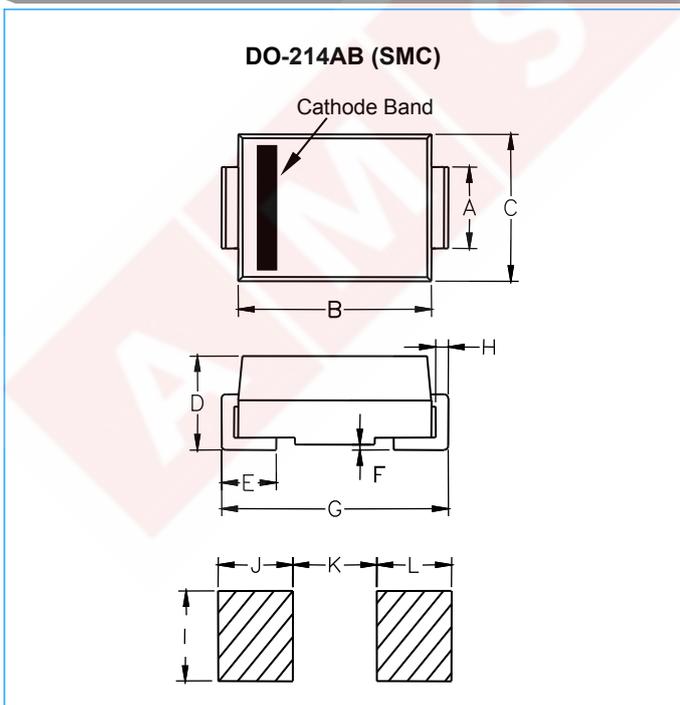
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
P6SMB6.8A	P6SMB6.8CA	6V8A	6V8C	5.8	6.46	7.14	10	10.5	57.14	1000
P6SMB7.5A	P6SMB7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	53.10	500
P6SMB8.2A	P6SMB8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	49.59	200
P6SMB9.1A	P6SMB9.1CA	9V1A	9V1C	7.8	8.65	9.56	1	13.4	44.78	50
P6SMB10A	P6SMB10CA	10A	10C	8.6	9.50	10.50	1	14.5	41.38	10
P6SMB11A	P6SMB11CA	11A	11C	9.4	10.45	11.55	1	15.6	38.46	5
P6SMB12A	P6SMB12CA	12A	12C	10.2	11.40	12.60	1	16.7	35.93	5
P6SMB13A	P6SMB13CA	13A	13C	11.1	12.35	13.65	1	18.2	32.97	5
P6SMB15A	P6SMB15CA	15A	15C	12.8	14.25	15.75	1	21.2	28.30	5
P6SMB16A	P6SMB16CA	16A	16C	13.6	15.20	16.80	1	22.5	26.67	5
P6SMB18A	P6SMB18CA	18A	18C	15.3	17.10	18.90	1	25.2	23.81	5
P6SMB20A	P6SMB20CA	20A	20C	17.1	19.00	21.00	1	27.7	21.66	5
P6SMB22A	P6SMB22CA	22A	22C	18.8	20.90	23.10	1	30.6	19.61	5
P6SMB24A	P6SMB24CA	24A	24C	20.5	22.80	25.20	1	33.2	18.07	5
P6SMB27A	P6SMB27CA	27A	27C	23.1	25.65	28.35	1	37.5	16.00	5
P6SMB30A	P6SMB30CA	30A	30C	25.6	28.50	31.50	1	41.4	14.49	5
P6SMB33A	P6SMB33CA	33A	33C	28.2	31.35	34.65	1	45.7	13.13	5
P6SMB36A	P6SMB36CA	36A	36C	30.8	34.20	37.80	1	49.9	12.02	5
P6SMB39A	P6SMB39CA	39A	39C	33.3	37.05	40.95	1	53.9	11.13	5
P6SMB43A	P6SMB43CA	43A	43C	36.8	40.85	45.15	1	59.3	10.12	5
P6SMB47A	P6SMB47CA	47A	47C	40.2	44.65	49.35	1	64.8	9.26	5
P6SMB51A	P6SMB51CA	51A	51C	43.6	48.45	53.55	1	70.1	8.56	5
P6SMB56A	P6SMB56CA	56A	56C	47.8	53.20	58.80	1	77.0	7.79	5
P6SMB62A	P6SMB62CA	62A	62C	53.0	58.90	65.10	1	85.0	7.06	5
P6SMB68A	P6SMB68CA	68A	68C	58.1	64.60	71.40	1	92.0	6.52	5
P6SMB75A	P6SMB75CA	75A	75C	64.1	71.25	78.75	1	103.0	5.83	5
P6SMB82A	P6SMB82CA	82A	82C	70.1	77.90	86.10	1	113.0	5.31	5
P6SMB91A	P6SMB91CA	91A	91C	77.8	86.45	95.55	1	125.0	4.80	5
P6SMB100A	P6SMB100CA	100A	100C	85.5	95.00	105.00	1	137.0	4.38	5
P6SMB110A	P6SMB110CA	110A	110C	94.0	104.50	115.50	1	152.0	3.95	5
P6SMB120A	P6SMB120CA	120A	120C	102.0	114.00	126.00	1	165.0	3.64	5
P6SMB130A	P6SMB130CA	130A	130C	111.0	123.50	136.50	1	179.0	3.35	5
P6SMB150A	P6SMB150CA	150A	150C	128.0	142.50	157.50	1	207.0	2.90	5
P6SMB160A	P6SMB160CA	160A	160C	136.0	152.00	168.00	1	219.0	2.74	5
P6SMB170A	P6SMB170CA	170A	170C	145.0	161.50	178.50	1	234.0	2.56	5
P6SMB180A	P6SMB180CA	180A	180C	154.0	171.00	189.00	1	246.0	2.44	5
P6SMB200A	P6SMB200CA	200A	200C	171.0	190.00	210.00	1	274.0	2.19	5
P6SMB220A	P6SMB220CA	220A	220C	185.0	209.00	231.00	1	328.0	1.83	5
P6SMB250A	P6SMB250CA	250A	250C	214.0	237.50	262.50	1	344.0	1.74	5
P6SMB300A	P6SMB300CA	300A	300C	256.0	285.00	315.00	1	414.0	1.45	5
P6SMB350A	P6SMB350CA	350A	350C	299.3	332.50	367.50	1	482.0	1.24	5
P6SMB380A	P6SMB380CA	380A	380C	324.9	361.00	399.00	1	524.4	1.14	5
P6SMB400A	P6SMB400CA	400A	400C	342.0	380.00	420.00	1	552.0	1.09	5
P6SMB440A	P6SMB440CA	440A	440C	376.2	418.00	462.00	1	607.2	0.99	5
P6SMB500A	P6SMB500CA	500A	500C	427.5	475.00	525.00	1	690.0	0.87	5
P6SMB520A	P6SMB520CA	520A	520C	444.6	494.00	546.00	1	717.6	0.84	5
P6SMB550A	P6SMB550CA	550A	550C	470.3	522.50	577.50	1	759.0	0.79	5
P6SMB600A	P6SMB600CA	600A	600C	513.0	570.00	630.00	1	828.0	0.72	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
1.5SMC Series 6.8 To 600 V 1500W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 1500W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AB (SMC)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.860	3.160
B	0.260	0.280	6.520	7.020
C	0.220	0.245	5.520	6.150
D	0.079	0.103	1.980	2.590
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.305	0.320	7.640	8.020
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Surface Mount Transient Voltage Suppressors (TVS)
1.5SMC Series 6.8 To 600 V 1500W
Electrical Characteristics (T_A=25°C unless otherwise noted)

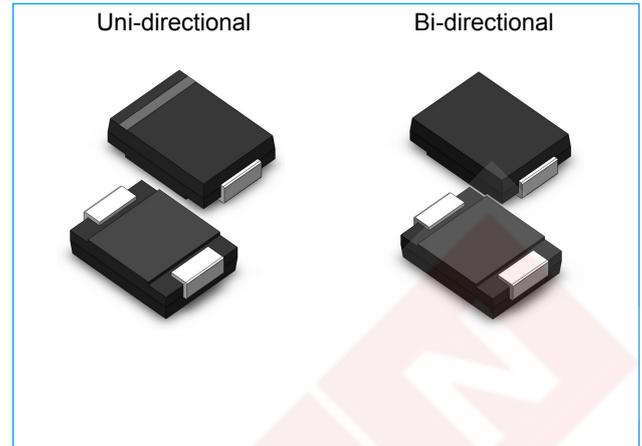
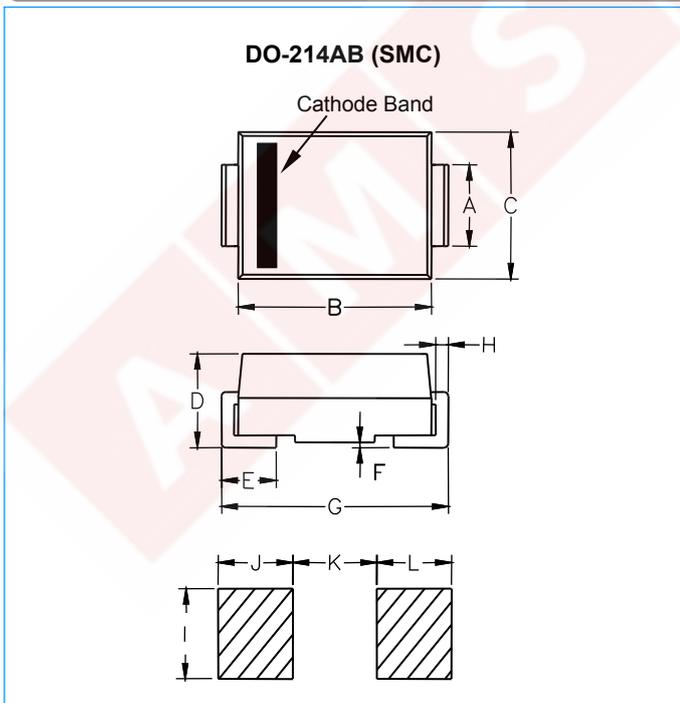
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
1.5SMC6.8A	1.5SMC6.8CA	6V8A	6V8C	5.8	6.46	7.14	10	10.5	142.86	1000
1.5SMC7.5A	1.5SMC7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	132.74	500
1.5SMC8.2A	1.5SMC8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	123.97	200
1.5SMC9.1A	1.5SMC9.1CA	9V1A	9V1C	7.8	8.65	9.56	1	13.4	111.94	50
1.5SMC10A	1.5SMC10CA	10A	10C	8.6	9.50	10.50	1	14.5	103.45	10
1.5SMC11A	1.5SMC11CA	11A	11C	9.4	10.45	11.55	1	15.6	96.15	5
1.5SMC12A	1.5SMC12CA	12A	12C	10.2	11.40	12.60	1	16.7	89.82	5
1.5SMC13A	1.5SMC13CA	13A	13C	11.1	12.35	13.65	1	18.2	82.42	5
1.5SMC15A	1.5SMC15CA	15A	15C	12.8	14.25	15.75	1	21.2	70.75	5
1.5SMC16A	1.5SMC16CA	16A	16C	13.6	15.20	16.80	1	22.5	66.67	5
1.5SMC18A	1.5SMC18CA	18A	18C	15.3	17.10	18.90	1	25.2	59.52	5
1.5SMC20A	1.5SMC20CA	20A	20C	17.1	19.00	21.00	1	27.7	54.15	5
1.5SMC22A	1.5SMC22CA	22A	22C	18.8	20.90	23.10	1	30.6	49.02	5
1.5SMC24A	1.5SMC24CA	24A	24C	20.5	22.80	25.20	1	33.2	45.18	5
1.5SMC27A	1.5SMC27CA	27A	27C	23.1	25.65	28.35	1	37.5	40.00	5
1.5SMC30A	1.5SMC30CA	30A	30C	25.6	28.50	31.50	1	41.4	36.23	5
1.5SMC33A	1.5SMC33CA	33A	33C	28.2	31.35	34.65	1	45.7	32.82	5
1.5SMC36A	1.5SMC36CA	36A	36C	30.8	34.20	37.80	1	49.9	30.06	5
1.5SMC39A	1.5SMC39CA	39A	39C	33.3	37.05	40.95	1	53.9	27.83	5
1.5SMC43A	1.5SMC43CA	43A	43C	36.8	40.85	45.15	1	59.3	25.30	5
1.5SMC47A	1.5SMC47CA	47A	47C	40.2	44.65	49.35	1	64.8	23.15	5
1.5SMC51A	1.5SMC51CA	51A	51C	43.6	48.45	53.55	1	70.1	21.40	5
1.5SMC56A	1.5SMC56CA	56A	56C	47.8	53.20	58.80	1	77.0	19.48	5
1.5SMC62A	1.5SMC62CA	62A	62C	53.0	58.90	65.10	1	85.0	17.65	5
1.5SMC68A	1.5SMC68CA	68A	68C	58.1	64.60	71.40	1	92.0	16.30	5
1.5SMC75A	1.5SMC75CA	75A	75C	64.1	71.25	78.75	1	103.0	14.56	5
1.5SMC82A	1.5SMC82CA	82A	82C	70.1	77.90	86.10	1	113.0	13.27	5
1.5SMC91A	1.5SMC91CA	91A	91C	77.8	86.45	95.55	1	125.0	12.00	5
1.5SMC100A	1.5SMC100CA	100A	100C	85.5	95.00	105.00	1	137.0	10.95	5
1.5SMC110A	1.5SMC110CA	110A	110C	94.0	104.50	115.50	1	152.0	9.87	5
1.5SMC120A	1.5SMC120CA	120A	120C	102.0	114.00	126.00	1	165.0	9.09	5
1.5SMC130A	1.5SMC130CA	130A	130C	111.0	123.50	136.50	1	179.0	8.38	5
1.5SMC150A	1.5SMC150CA	150A	150C	128.0	142.50	157.50	1	207.0	7.25	5
1.5SMC160A	1.5SMC160CA	160A	160C	136.0	152.00	168.00	1	219.0	6.85	5
1.5SMC170A	1.5SMC170CA	170A	170C	145.0	161.50	178.50	1	234.0	6.41	5
1.5SMC180A	1.5SMC180CA	180A	180C	154.0	171.00	189.00	1	246.0	6.10	5
1.5SMC200A	1.5SMC200CA	200A	200C	171.0	190.00	210.00	1	274.0	5.47	5
1.5SMC220A	1.5SMC220CA	220A	220C	185.0	209.00	231.00	1	328.0	4.57	5
1.5SMC250A	1.5SMC250CA	250A	250C	214.0	237.50	262.50	1	344.0	4.36	5
1.5SMC300A	1.5SMC300CA	300A	300C	256.0	285.00	315.00	1	414.0	3.62	5
1.5SMC350A	1.5SMC350CA	350A	350C	299.3	332.50	367.50	1	482.0	3.11	5
1.5SMC380A	1.5SMC380CA	380A	380C	324.9	361.00	399.00	1	524.4	2.86	5
1.5SMC400A	1.5SMC400CA	400A	400C	342.0	380.00	420.00	1	552.0	2.72	5
1.5SMC440A	1.5SMC440CA	440A	440C	376.2	418.00	462.00	1	607.2	2.47	5
1.5SMC500A	1.5SMC500CA	500A	500C	427.5	475.00	525.00	1	690.0	2.17	5
1.5SMC520A	1.5SMC520CA	520A	520C	444.6	494.00	546.00	1	717.6	2.09	5
1.5SMC550A	1.5SMC550CA	550A	550C	470.3	522.50	577.50	1	759.0	1.98	5
1.5SMC600A	1.5SMC600CA	600A	600C	513.0	570.00	630.00	1	828.0	1.81	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
5.0SMDJ Series 11 To 440 V 5000W
Features

- ◆ For surface mounted applications in order to optimize board space
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Glass passivated junction
- ◆ Low inductance
- ◆ Excellent clamping capability
- ◆ 5000W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 25V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-214AB (SMC)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.860	3.160
B	0.260	0.280	6.520	7.020
C	0.220	0.245	5.520	6.150
D	0.079	0.103	1.980	2.590
E	0.030	0.060	0.750	1.510
F	-	0.008	-	0.203
G	0.305	0.320	7.640	8.020
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
5.0SMDJ11	5.0SMDJ11C	5PDW	5BDW	11.0	12.20	14.90	1	20.1	251.24	800
5.0SMDJ11A	5.0SMDJ11CA	5PDX	5BDX	11.0	12.20	13.50	1	18.2	277.47	800
5.0SMDJ12	5.0SMDJ12C	5PDY	5BDY	12.0	13.30	16.30	1	22.0	229.55	800
5.0SMDJ12A	5.0SMDJ12CA	5PDZ	5BDZ	12.0	13.30	14.70	1	19.9	253.77	800
5.0SMDJ13	5.0SMDJ13C	5PED	5BED	13.0	14.40	17.60	1	23.8	212.18	500
5.0SMDJ13A	5.0SMDJ13CA	5PEE	5BEE	13.0	14.40	15.90	1	21.5	234.88	500
5.0SMDJ14	5.0SMDJ14C	5PEF	5BEF	14.0	15.60	19.10	1	25.8	195.74	200
5.0SMDJ14A	5.0SMDJ14CA	5PEG	5BEG	14.0	15.60	17.20	1	23.2	217.67	200
5.0SMDJ15	5.0SMDJ15C	5PEH	5BEH	15.0	16.70	20.40	1	26.9	187.73	100
5.0SMDJ15A	5.0SMDJ15CA	5PEK	5BEK	15.0	16.70	18.50	1	24.4	206.97	100
5.0SMDJ16	5.0SMDJ16C	5PEL	5BEL	16.0	17.80	21.80	1	28.8	175.35	50
5.0SMDJ16A	5.0SMDJ16CA	5PEM	5BEM	16.0	17.80	19.70	1	26.0	194.23	50
5.0SMDJ17	5.0SMDJ17C	5PEN	5BEN	17.0	18.90	23.10	1	30.5	165.57	20
5.0SMDJ17A	5.0SMDJ17CA	5PEP	5BEP	17.0	18.90	20.90	1	27.6	182.97	20
5.0SMDJ18	5.0SMDJ18C	5PEQ	5BEQ	18.0	20.00	24.40	1	32.2	156.83	10
5.0SMDJ18A	5.0SMDJ18CA	5PER	5BER	18.0	20.00	22.10	1	29.2	172.95	10
5.0SMDJ19	5.0SMDJ19C	5PES	5BES	19.0	21.13	25.76	1	34.0	148.49	10
5.0SMDJ19A	5.0SMDJ19CA	5PET	5BET	19.0	21.10	23.30	1	30.8	164.07	10
5.0SMDJ20	5.0SMDJ20C	5PEU	5BEU	20.0	22.20	27.10	1	35.8	141.06	5
5.0SMDJ20A	5.0SMDJ20CA	5PEV	5BEV	20.0	22.20	24.50	1	32.4	155.86	5
5.0SMDJ22	5.0SMDJ22C	5PEW	5BEW	22.0	24.40	29.80	1	39.4	128.17	5
5.0SMDJ22A	5.0SMDJ22CA	5PEX	5BEX	22.0	24.40	26.90	1	35.5	142.25	5
5.0SMDJ24	5.0SMDJ24C	5PEY	5BEY	24.0	26.70	32.60	1	43.0	117.44	5
5.0SMDJ24A	5.0SMDJ24CA	5PEZ	5BEZ	24.0	26.70	29.50	1	38.9	129.82	5
5.0SMDJ26	5.0SMDJ26C	5PFD	5BFD	26.0	28.90	35.30	1	46.6	108.37	5
5.0SMDJ26A	5.0SMDJ26CA	5PFE	5BFE	26.0	28.90	31.90	1	42.1	119.95	5
5.0SMDJ28	5.0SMDJ28C	5PFF	5BFF	28.0	31.10	38.00	1	50.0	101.00	5
5.0SMDJ28A	5.0SMDJ28CA	5PFG	5BFG	28.0	31.10	34.40	1	45.4	111.23	5
5.0SMDJ30	5.0SMDJ30C	5PFH	5BFH	30.0	33.30	40.70	1	53.5	94.39	5
5.0SMDJ30A	5.0SMDJ30CA	5PFK	5BFK	30.0	33.30	36.80	1	48.4	104.34	5
5.0SMDJ33	5.0SMDJ33C	5PFL	5BFL	33.0	36.70	44.90	1	59.0	85.59	5
5.0SMDJ33A	5.0SMDJ33CA	5PFM	5BFM	33.0	36.70	40.60	1	53.3	94.75	5
5.0SMDJ36	5.0SMDJ36C	5PFN	5BFN	36.0	40.00	48.90	1	64.3	78.54	5
5.0SMDJ36A	5.0SMDJ36CA	5PFP	5BFP	36.0	40.00	44.20	1	58.1	86.92	5
5.0SMDJ40	5.0SMDJ40C	5PFQ	5BFQ	40.0	44.40	54.30	1	71.4	70.73	5
5.0SMDJ40A	5.0SMDJ40CA	5PFR	5BFR	40.0	44.40	49.10	1	64.5	78.29	5
5.0SMDJ43	5.0SMDJ43C	5PFS	5BFS	43.0	47.80	58.40	1	76.7	65.84	5
5.0SMDJ43A	5.0SMDJ43CA	5PFT	5BFT	43.0	47.80	52.80	1	69.4	72.77	5
5.0SMDJ45	5.0SMDJ45C	5PFU	5BFU	45.0	50.00	61.10	1	80.3	62.89	5
5.0SMDJ45A	5.0SMDJ45CA	5PFV	5BFV	45.0	50.00	55.30	1	72.7	69.46	5
5.0SMDJ48	5.0SMDJ48C	5PFW	5BFW	48.0	53.30	65.10	1	85.5	59.06	5
5.0SMDJ48A	5.0SMDJ48CA	5PFX	5BFX	48.0	53.30	58.90	1	77.4	65.25	5
5.0SMDJ51	5.0SMDJ51C	5PFY	5BFY	51.0	56.70	69.30	1	91.1	55.43	5
5.0SMDJ51A	5.0SMDJ51CA	5PFZ	5BFZ	51.0	56.70	62.70	1	82.4	61.29	5
5.0SMDJ54	5.0SMDJ54C	5PGD	5BGD	54.0	60.00	73.30	1	96.3	52.44	5
5.0SMDJ54A	5.0SMDJ54CA	5PGE	5BGE	54.0	60.00	66.30	1	87.1	57.98	5
5.0SMDJ58	5.0SMDJ58C	5PGF	5BGF	58.0	64.40	78.70	1	103.0	49.03	5
5.0SMDJ58A	5.0SMDJ58CA	5PGG	5BGG	58.0	64.40	71.20	1	93.6	53.95	5

Surface Mount Transient Voltage Suppressors (TVS)
5.0SMDJ Series 11 To 440 V 5000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

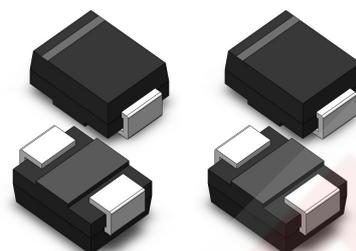
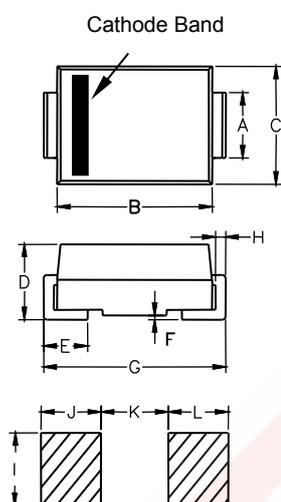
Part Number		Marking		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi	Uni	Bi		MIN	MAX				
5.0SMDJ60	5.0SMDJ60C	5PGH	5BGH	60.0	66.70	81.50	1	107.0	47.20	5
5.0SMDJ60A	5.0SMDJ60CA	5PGK	5BGK	60.0	66.70	73.70	1	96.8	52.17	5
5.0SMDJ64	5.0SMDJ64C	5PGL	5BGL	64.0	71.10	86.90	1	114.0	44.30	5
5.0SMDJ64A	5.0SMDJ64CA	5PGM	5BGM	64.0	71.10	78.60	1	103.0	49.03	5
5.0SMDJ70	5.0SMDJ70C	5PGN	5BGN	70.0	77.80	95.10	1	125.0	40.40	5
5.0SMDJ70A	5.0SMDJ70CA	5PGP	5BGP	70.0	77.80	86.00	1	113.0	44.69	5
5.0SMDJ75	5.0SMDJ75C	5PGQ	5BGQ	75.0	83.30	102.00	1	134.0	37.69	5
5.0SMDJ75A	5.0SMDJ75CA	5PGR	5BGR	75.0	83.30	92.10	1	121.0	41.74	5
5.0SMDJ78	5.0SMDJ78C	5PGS	5BGS	78.0	86.70	106.00	1	139.0	36.33	5
5.0SMDJ78A	5.0SMDJ78CA	5PGT	5BGT	78.0	86.70	95.80	1	126.0	40.08	5
5.0SMDJ80	5.0SMDJ80C	5PGA	5BGA	80.0	88.96	108.80	1	143.2	35.27	5
5.0SMDJ80A	5.0SMDJ80CA	5PGB	5BGB	80.0	88.80	97.60	1	129.6	38.97	5
5.0SMDJ85	5.0SMDJ85C	5PGU	5BGU	85.0	94.40	115.00	1	151.0	33.44	5
5.0SMDJ85A	5.0SMDJ85CA	5PGV	5BGV	85.0	94.40	104.00	1	137.0	36.86	5
5.0SMDJ90	5.0SMDJ90C	5PGW	5BGW	90.0	100.00	122.00	1	160.0	31.56	5
5.0SMDJ90A	5.0SMDJ90CA	5PGX	5BGX	90.0	100.00	111.00	1	146.0	34.59	5
5.0SMDJ100	5.0SMDJ100C	5PGY	5BGY	100.0	111.00	136.00	1	179.0	28.21	5
5.0SMDJ100A	5.0SMDJ100CA	5PGZ	5BGZ	100.0	111.00	123.00	1	162.0	31.17	5
5.0SMDJ110	5.0SMDJ110C	5PHD	5BHD	110.0	122.00	149.00	1	196.0	25.77	5
5.0SMDJ110A	5.0SMDJ110CA	5PHE	5BHE	110.0	122.00	135.00	1	177.0	28.53	5
5.0SMDJ120	5.0SMDJ120C	5PHF	5BHF	120.0	133.00	163.00	1	214.0	23.60	5
5.0SMDJ120A	5.0SMDJ120CA	5PHG	5BHG	120.0	133.00	147.00	1	193.0	26.17	5
5.0SMDJ130	5.0SMDJ130C	5PHH	5BHH	130.0	144.00	176.00	1	231.0	21.86	5
5.0SMDJ130A	5.0SMDJ130CA	5PHK	5BHK	130.0	144.00	159.00	1	209.0	24.16	5
5.0SMDJ140	5.0SMDJ140C	5PHA	5BHA	140.0	155.68	190.40	1	250.6	20.15	5
5.0SMDJ140A	5.0SMDJ140CA	5PHB	5BHB	140.0	155.00	171.00	1	226.8	22.27	5
5.0SMDJ150	5.0SMDJ150C	5PHL	5BHL	150.0	167.00	204.00	1	268.0	18.84	5
5.0SMDJ150A	5.0SMDJ150CA	5PHM	5BHM	150.0	167.00	185.00	1	243.0	20.78	5
5.0SMDJ160	5.0SMDJ160C	5PHN	5BHN	160.0	178.00	218.00	1	287.0	17.60	5
5.0SMDJ160A	5.0SMDJ160CA	5PHP	5BHP	160.0	178.00	197.00	1	259.0	19.50	5
5.0SMDJ170	5.0SMDJ170C	5PHQ	5BHQ	170.0	189.00	231.00	1	304.0	16.61	5
5.0SMDJ170A	5.0SMDJ170CA	5PHR	5BHR	170.0	189.00	209.00	1	275.0	18.36	5
5.0SMDJ180	5.0SMDJ180C	5PHS	5BHS	180.0	201.00	244.80	1	322.2	15.67	5
5.0SMDJ180A	5.0SMDJ180CA	5PHT	5BHT	180.0	201.00	220.00	1	291.6	17.32	5
5.0SMDJ190	5.0SMDJ190C	5PHU	5BHU	190.0	211.21	258.40	1	340.1	14.85	5
5.0SMDJ190A	5.0SMDJ190CA	5PHV	5BHV	190.0	211.00	232.00	1	307.8	16.41	5
5.0SMDJ200A	5.0SMDJ200CA	5PHW	5BHW	200.0	224.00	247.00	1	324.0	9.26	5
5.0SMDJ220A	5.0SMDJ220CA	5PHX	5BHX	220.0	246.00	272.00	1	356.0	8.43	5
5.0SMDJ250A	5.0SMDJ250CA	5PHZ	5BHZ	250.0	279.00	309.00	1	405.0	7.41	5
5.0SMDJ300A	5.0SMDJ300CA	5PJE	5BJE	300.0	335.00	371.00	1	486.0	6.17	5
5.0SMDJ350A	5.0SMDJ350CA	5PJG	5BJG	350.0	391.00	432.00	1	567.0	5.29	5
5.0SMDJ400A	5.0SMDJ400CA	5PKJ	5BJK	400.0	447.00	494.00	1	648.0	4.63	5
5.0SMDJ440A	5.0SMDJ440CA	5PJM	5BJM	440.0	492.00	543.00	1	713.0	4.21	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Surface Mount Transient Voltage Suppressors (TVS)
SACB Series 5.0 To 190 V 500W Low Capacitance
Features

- ◆ Glass passivated chip
- ◆ 500W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01%
- ◆ Low leakage
- ◆ Excellent clamping capability
- ◆ Very fast response time
- ◆ RoHS compliant

Uni-directional

DO-214AA(SMB)
Dimensions
DO-214AA (SMB)


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.087	1.960	2.200
B	0.171	0.191	4.350	4.850
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.750	1.520
F	-	0.008	-	0.203
G	0.201	0.216	5.100	5.500
H	0.006	0.012	0.152	0.305
I	0.089	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

Electrical Characteristics (T_A=25°C unless otherwise noted)

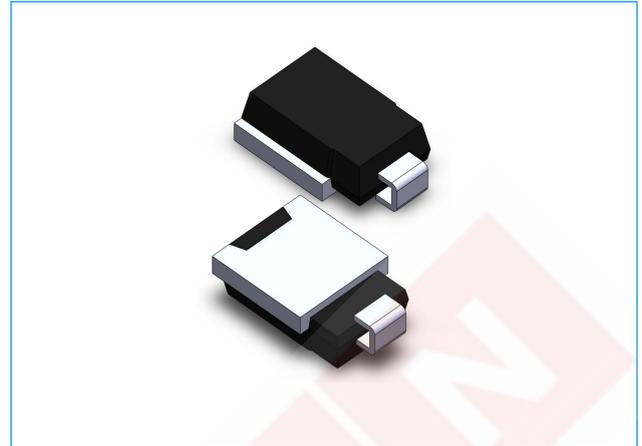
Part Number	Device Marking Code	Reverse Stand-Off Voltage VRWM (V)	Breakdown Voltage VBR @IT=1.0mA (V)	Maximum Reverse Leakage IR @VRWM (μ A)	Maximum Clamping Voltage VC @IPP (V)	Maximum Peak Pulse Current IPP (A)	Maximum Junction Capacitance @0V (pF)	Working Inverse Blocking Voltage VWIB (V)	Inverse Blocking Leakage Current IIB @VWIB (mA)	Peak Inverse Voltage VPIB (V)
			MIN							
SACB5.0	SAD	5.0	7.60	300	10.0	44.0	45	75	1	100
SACB6.0	SAE	6.0	7.90	300	11.2	41.0	45	75	1	100
SACB7.0	SAF	7.0	8.33	300	12.6	38.0	45	75	1	100
SACB8.0	SAG	8.0	8.89	100	13.4	36.0	45	75	1	100
SACB8.5	SAH	8.5	9.44	50	14.0	34.0	45	75	1	100
SACB10	SAK	10.0	11.10	5	16.3	29.0	45	75	1	100
SACB12	SAL	12.0	13.30	5	19.0	25.0	45	75	1	100
SACB15	SAM	15.0	16.67	5	23.6	20.0	45	75	1	100
SACB18	SAN	18.0	20.00	5	28.8	15.0	45	75	1	100
SACB22	SAP	22.0	24.40	5	35.4	14.0	45	75	1	100
SACB26	SAQ	26.0	28.90	5	42.3	11.1	45	75	1	100
SACB30	SAR	30.0	33.30	5	48.6	10.0	45	75	1	100
SACB36	SAS	36.0	40.00	5	60.0	8.6	45	75	1	100
SACB45	SAT	45.0	50.00	5	77.0	6.8	45	150	1	200
SACB50	SAU	50.0	55.50	5	88.0	5.8	45	150	1	200

Surface Mount Transient Voltage Suppressors (TVS)

SM8S Series 10 To 43 V 6600W

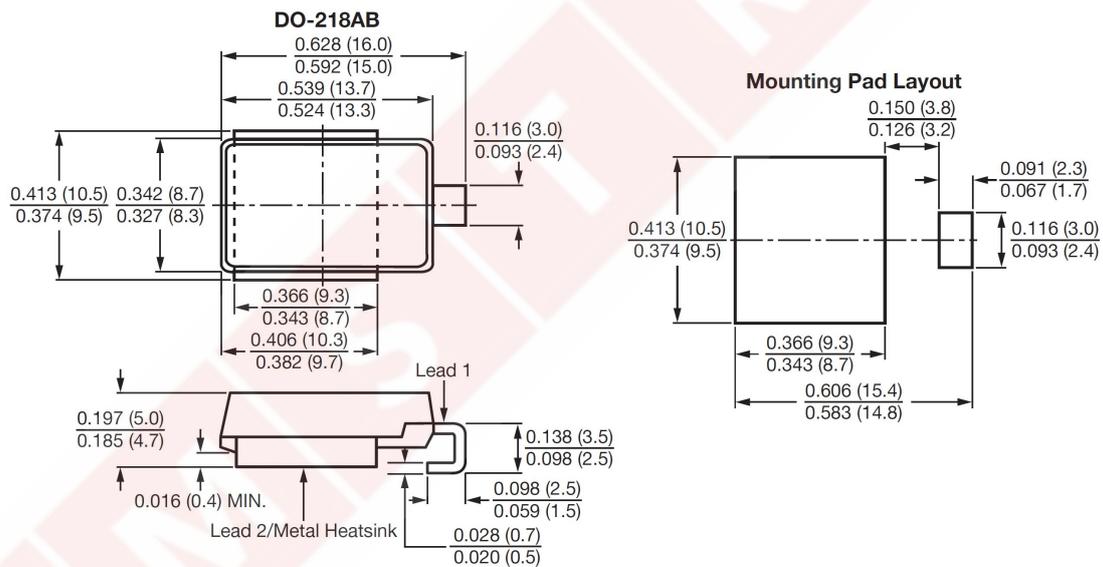
Features

- ◆ Junction passivation optimized design passivated anisotropic rectifier technology
- ◆ $T_j=175^{\circ}\text{C}$ capability suitable for high reliability and automotive requirement
- ◆ Available in uni-directional polarity only
- ◆ Low leakage current
- ◆ Low forward voltage drop
- ◆ High surge capability
- ◆ Meets ISO7637-2 surge specification (varied by test condition)
- ◆ Meets MSL level 1, per J-STD-020, LF maximum peak of 245°C
- ◆ AEC-Q101 qualified
- ◆ Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



DO-218AB

Dimensions



Surface Mount Transient Voltage Suppressors (TVS)
SM8S Series 10 To 43 V 6600W
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

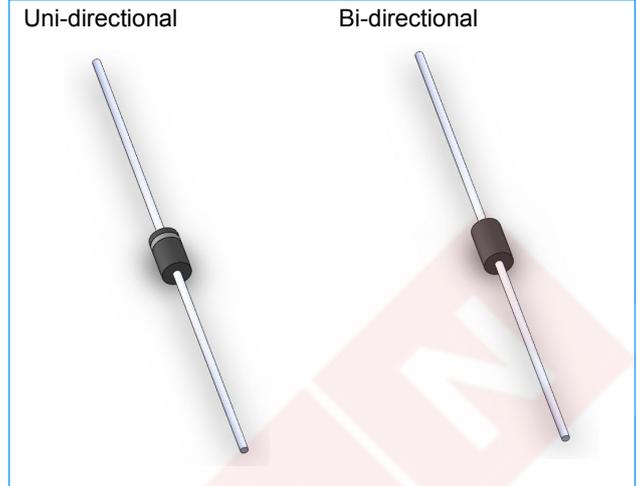
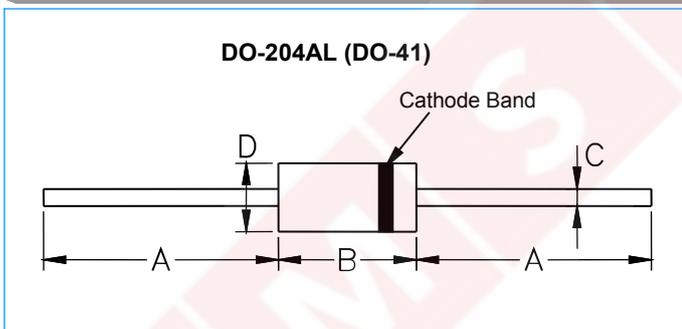
Part Number	Stand-Off Voltage V_{MW} (V)	Breakdown Voltage V_{BR} (V)		Test Current I_T (mA)	Maximum Reverse Leakage at V_{WM} I_D (μA)	Maximum Reverse at V_{WM} $T_J=175^\circ\text{C}$ I_D (μA)	Maximum Peak Pulse Current at 10/1000 μs Waveform (A)	Maximum Clamping Voltage at I_{PPM} V_C (V)
		MIN.	MAX.					
SM8S10	10.0	11.1	13.6	5.0	15	250	351	18.8
SM8S10A	10.0	11.1	12.3	5.0	15	250	388	17.0
SM8S11	11.0	12.2	14.9	5.0	10	150	328	20.1
SM8S11A	11.0	12.2	13.5	5.0	10	150	363	18.2
SM8S12	12.0	13.3	16.3	5.0	10	150	300	22.0
SM8S12A	12.0	13.3	14.7	5.0	10	150	332	19.9
SM8S13	13.0	14.4	17.6	5.0	10	150	277	23.8
SM8S13A	13.0	14.4	15.9	5.0	10	150	307	21.5
SM8S14	14.0	15.6	19.1	5.0	10	150	256	25.8
SM8S14A	14.0	15.6	17.2	5.0	10	150	284	23.2
SM8S15	15.0	16.7	20.4	5.0	10	150	245	26.9
SM8S15A	15.0	16.7	18.5	5.0	10	150	270	24.4
SM8S16	16.0	17.8	21.8	5.0	10	150	229	28.8
SM8S16A	16.0	17.8	19.7	5.0	10	150	254	26.0
SM8S17	17.0	18.9	23.1	5.0	10	150	216	30.5
SM8S17A	17.0	18.9	20.9	5.0	10	150	239	27.6
SM8S18	18.0	20.0	24.4	5.0	10	150	205	32.2
SM8S18A	18.0	20.0	22.1	5.0	10	150	226	29.2
SM8S20	20.0	22.2	27.1	5.0	10	150	184	35.8
SM8S20A	20.0	22.2	24.5	5.0	10	150	204	32.4
SM8S22	22.0	24.4	29.8	5.0	10	150	168	39.4
SM8S22A	22.0	24.4	26.9	5.0	10	150	186	35.5
SM8S24	24.0	26.7	32.6	5.0	10	150	153	43.0
SM8S24A	24.0	26.7	29.5	5.0	10	150	170	38.9
SM8S26	26.0	28.9	35.3	5.0	10	150	142	46.6
SM8S26A	26.0	28.9	31.9	5.0	10	150	157	42.1
SM8S28	28.0	31.1	38.0	5.0	10	150	132	50.1
SM8S28A	28.0	31.1	34.4	5.0	10	150	145	45.4
SM8S30	30.0	33.3	40.7	5.0	10	150	123	53.5
SM8S30A	30.0	33.3	36.8	5.0	10	150	136	48.4
SM8S33	33.0	36.7	44.9	5.0	10	150	112	59.0
SM8S33A	33.0	36.7	40.6	5.0	10	150	124	53.3
SM8S36	36.0	40.0	48.9	5.0	10	150	103	64.3
SM8S36A	36.0	40.0	44.2	5.0	10	150	114	58.1
SM8S40	40.0	44.4	54.3	5.0	10	150	92.4	71.4
SM8S40A	40.0	44.4	49.1	5.0	10	150	102	64.5
SM8S43	43.0	47.8	58.4	5.0	10	150	86	76.7
SM8S43A	43.0	47.8	52.8	5.0	10	150	95.1	69.4

Note:

For all types maximum $V_F = 1.8\text{V}$ at $I_F = 100\text{A}$ measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.

Axial Lead Transient Voltage Suppressors (TVS)
P4KE Series 6.8 To 600 V 400W
Features

- ◆ Glass passivated chip junction in DO-41 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 400W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-204AL (DO-41)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.165	0.205	4.19	5.21
C	0.028	0.033	0.71	0.84
D	0.090	0.117	2.29	2.97

Axial Lead Transient Voltage Suppressors (TVS)
P4KE Series 6.8 To 600 V 400W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
P4KE6.8	P4KE6.8C	5.5	6.12	7.48	10	10.8	37.04	1000
P4KE6.8A	P4KE6.8CA	5.8	6.46	7.14	10	10.5	38.10	1000
P4KE7.5	P4KE7.5C	6.1	6.75	8.25	10	11.7	34.19	500
P4KE7.5A	P4KE7.5CA	6.4	7.13	7.88	10	11.3	35.40	500
P4KE8.2	P4KE8.2C	6.6	7.38	9.02	10	12.5	32.00	200
P4KE8.2A	P4KE8.2CA	7.0	7.79	8.61	10	12.1	33.06	200
P4KE9.1	P4KE9.1C	7.4	8.19	10.01	1	13.8	28.99	50
P4KE9.1A	P4KE9.1CA	7.8	8.65	9.56	1	13.4	29.85	50
P4KE10	P4KE10C	8.1	9.00	11.00	1	15.0	26.67	10
P4KE10A	P4KE10CA	8.6	9.50	10.50	1	14.5	27.59	10
P4KE11	P4KE11C	8.9	9.90	12.10	1	16.2	24.69	5
P4KE11A	P4KE11CA	9.4	10.45	11.55	1	15.6	25.64	5
P4KE12	P4KE12C	9.7	10.80	13.20	1	17.3	23.12	5
P4KE12A	P4KE12CA	10.2	11.40	12.60	1	16.7	23.95	5
P4KE13	P4KE13C	10.5	11.70	14.30	1	19.0	21.05	5
P4KE13A	P4KE13CA	11.1	12.35	13.65	1	18.2	21.98	5
P4KE15	P4KE15C	12.1	13.50	16.50	1	22.0	18.18	5
P4KE15A	P4KE15CA	12.8	14.25	15.75	1	21.2	18.87	5
P4KE16	P4KE16C	12.9	14.40	17.60	1	23.5	17.02	5
P4KE16A	P4KE16CA	13.6	15.20	16.80	1	22.5	17.78	5
P4KE18	P4KE18C	14.5	16.20	19.80	1	26.5	15.09	5
P4KE18A	P4KE18CA	15.3	17.10	18.90	1	25.2	15.87	5
P4KE20	P4KE20C	16.2	18.00	22.00	1	29.1	13.75	5
P4KE20A	P4KE20CA	17.1	19.00	21.00	1	27.7	14.44	5
P4KE22	P4KE22C	17.8	19.80	24.20	1	31.9	12.54	5
P4KE22A	P4KE22CA	18.8	20.90	23.10	1	30.6	13.07	5
P4KE24	P4KE24C	19.4	21.60	26.40	1	34.7	11.53	5
P4KE24A	P4KE24CA	20.5	22.80	25.20	1	33.2	12.05	5
P4KE27	P4KE27C	21.8	24.30	29.70	1	39.1	10.23	5
P4KE27A	P4KE27CA	23.1	25.65	28.35	1	37.5	10.67	5
P4KE30	P4KE30C	24.3	27.00	33.00	1	43.5	9.20	5
P4KE30A	P4KE30CA	25.6	28.50	31.50	1	41.4	9.66	5
P4KE33	P4KE33C	26.8	29.70	36.30	1	47.7	8.39	5
P4KE33A	P4KE33CA	28.2	31.35	34.65	1	45.7	8.75	5
P4KE36	P4KE36C	29.1	32.40	39.60	1	52.0	7.69	5
P4KE36A	P4KE36CA	30.8	34.20	37.80	1	49.9	8.02	5
P4KE39	P4KE39C	31.6	35.10	42.90	1	56.4	7.09	5
P4KE39A	P4KE39CA	33.3	37.05	40.95	1	53.9	7.42	5
P4KE43	P4KE43C	34.8	38.70	47.30	1	61.9	6.46	5
P4KE43A	P4KE43CA	36.8	40.85	45.15	1	59.3	6.75	5
P4KE47	P4KE47C	38.1	42.30	51.70	1	67.8	5.90	5
P4KE47A	P4KE47CA	40.2	44.65	49.35	1	64.8	6.17	5
P4KE51	P4KE51C	41.3	45.90	56.10	1	73.5	5.44	5
P4KE51A	P4KE51CA	43.6	48.45	53.55	1	70.1	5.71	5
P4KE56	P4KE56C	45.4	50.40	61.60	1	80.5	4.97	5
P4KE56A	P4KE56CA	47.8	53.20	58.80	1	77.0	5.19	5
P4KE62	P4KE62C	50.2	55.80	68.20	1	89.0	4.49	5
P4KE62A	P4KE62CA	53.0	58.90	65.10	1	85.0	4.71	5
P4KE68	P4KE68C	55.1	61.20	74.80	1	98.0	4.08	5
P4KE68A	P4KE68CA	58.1	64.60	71.40	1	92.0	4.35	5
P4KE75	P4KE75C	60.7	67.50	82.50	1	108.0	3.70	5
P4KE75A	P4KE75CA	64.1	71.25	78.75	1	103.0	3.88	5
P4KE82	P4KE82C	66.4	73.80	90.20	1	118.0	3.39	5
P4KE82A	P4KE82CA	70.1	77.90	86.10	1	113.0	3.54	5

Axial Lead Transient Voltage Suppressors (TVS)
P4KE Series 6.8 To 600 V 400W
Electrical Characteristics (T_A=25°C unless otherwise noted)

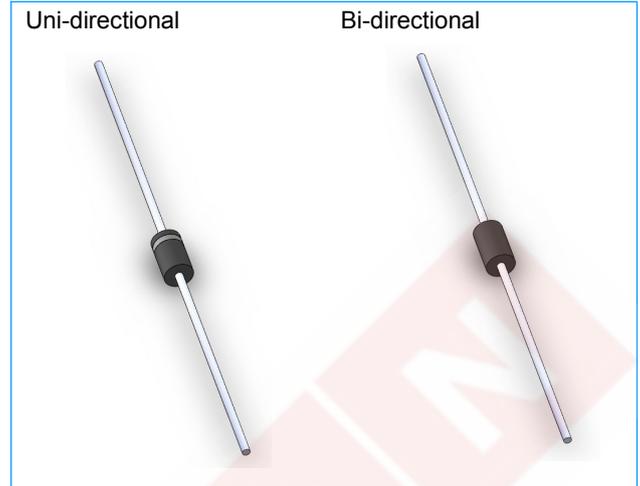
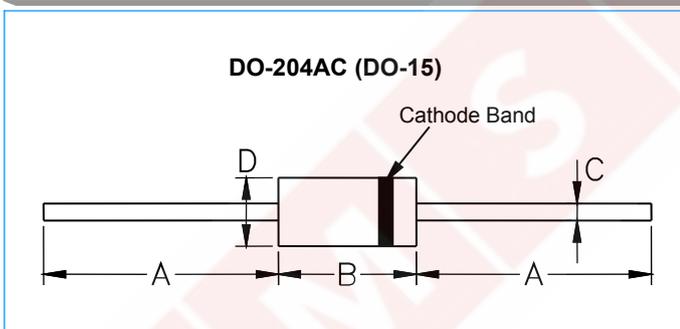
Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi		MIN	MAX				
P4KE91	P4KE91C	73.7	81.90	100.10	1	131.0	3.05	5
P4KE91A	P4KE91CA	77.8	86.45	95.55	1	125.0	3.20	5
P4KE100	P4KE100C	81.0	90.00	110.00	1	144.0	2.78	5
P4KE100A	P4KE100CA	85.5	95.00	105.00	1	137.0	2.92	5
P4KE110	P4KE110C	89.2	99.00	121.00	1	158.0	2.53	5
P4KE110A	P4KE110CA	94.0	104.50	115.50	1	152.0	2.63	5
P4KE120	P4KE120C	97.2	108.00	132.00	1	173.0	2.31	5
P4KE120A	P4KE120CA	102.0	114.00	126.00	1	165.0	2.42	5
P4KE130	P4KE130C	105.0	117.00	143.00	1	187.0	2.14	5
P4KE130A	P4KE130CA	111.0	123.50	136.50	1	179.0	2.23	5
P4KE150	P4KE150C	121.0	135.00	165.00	1	215.0	1.86	5
P4KE150A	P4KE150CA	128.0	142.50	157.50	1	207.0	1.93	5
P4KE160	P4KE160C	130.0	144.00	176.00	1	230.0	1.74	5
P4KE160A	P4KE160CA	136.0	152.00	168.00	1	219.0	1.83	5
P4KE170	P4KE170C	138.0	153.00	187.00	1	244.0	1.64	5
P4KE170A	P4KE170CA	145.0	161.50	178.50	1	234.0	1.71	5
P4KE180	P4KE180C	146.0	162.00	198.00	1	258.0	1.55	5
P4KE180A	P4KE180CA	154.0	171.00	189.00	1	246.0	1.63	5
P4KE200	P4KE200C	162.0	180.00	220.00	1	287.0	1.39	5
P4KE200A	P4KE200CA	171.0	190.00	210.00	1	274.0	1.46	5
P4KE220	P4KE220C	175.0	198.00	242.00	1	344.0	1.16	5
P4KE220A	P4KE220CA	185.0	209.00	231.00	1	328.0	1.22	5
P4KE250	P4KE250C	202.0	225.00	275.00	1	360.0	1.11	5
P4KE250A	P4KE250CA	214.0	237.50	262.50	1	344.0	1.16	5
P4KE300	P4KE300C	243.0	270.00	330.00	1	430.0	0.93	5
P4KE300A	P4KE300CA	256.0	285.00	315.00	1	414.0	0.97	5
P4KE350	P4KE350C	284.0	315.00	385.00	1	504.0	0.79	5
P4KE350A	P4KE350CA	299.3	332.50	367.50	1	482.0	0.83	5
P4KE380	P4KE380C	308.6	342.00	418.00	1	547.2	0.73	5
P4KE380A	P4KE380CA	324.9	361.00	399.00	1	524.4	0.76	5
P4KE400	P4KE400C	324.8	360.00	440.00	1	576.0	0.69	5
P4KE400A	P4KE400CA	342.0	380.00	420.00	1	552.0	0.72	5
P4KE440	P4KE440C	357.3	396.00	484.00	1	633.6	0.63	5
P4KE440A	P4KE440CA	376.2	418.00	462.00	1	607.2	0.66	5
P4KE500	P4KE500C	406.0	450.00	550.00	1	720.0	0.56	5
P4KE500A	P4KE500CA	427.5	475.00	525.00	1	690.0	0.58	5
P4KE520	P4KE520C	422.2	468.00	572.00	1	748.8	0.53	5
P4KE520A	P4KE520CA	444.6	494.00	546.00	1	717.6	0.56	5
P4KE550	P4KE550C	446.6	495.00	605.00	1	792.0	0.51	5
P4KE550A	P4KE550CA	470.3	522.50	577.50	1	759.0	0.53	5
P4KE600	P4KE600C	487.2	540.00	660.00	1	864.0	0.46	5
P4KE600A	P4KE600CA	513.0	570.00	630.00	1	828.0	0.48	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)
SA Series 5.0 To 190 V 500W
Features

- ◆ Glass passivated chip junction in DO-15 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 500W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-204AC (DO-15)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.230	0.300	5.85	7.63
C	0.028	0.033	0.71	0.84
D	0.102	0.142	2.60	3.61

Axial Lead Transient Voltage Suppressors (TVS)
SA Series 5.0 To 190 V 500W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
SA5.0	SA5.0C	5.0	6.40	7.30	10	9.6	52.08	600
SA5.0A	SA5.0CA	5.0	6.40	7.00	10	9.2	54.35	600
SA6.0	SA6.0C	6.0	6.67	8.15	10	11.4	43.86	600
SA6.0A	SA6.0CA	6.0	6.67	7.37	10	10.3	48.54	600
SA6.5	SA6.5C	6.5	7.22	8.82	10	12.3	40.65	400
SA6.5A	SA6.5CA	6.5	7.22	7.98	10	11.2	44.64	400
SA7.0	SA7.0C	7.0	7.78	9.51	10	13.3	37.59	150
SA7.0A	SA7.0CA	7.0	7.78	8.60	10	12.0	41.67	150
SA7.5	SA7.5C	7.5	8.33	10.20	1	14.3	34.97	50
SA7.5A	SA7.5CA	7.5	8.33	9.21	1	12.9	38.76	50
SA8.0	SA8.0C	8.0	8.89	10.90	1	15.0	33.33	25
SA8.0A	SA8.0CA	8.0	8.89	9.83	1	13.6	36.76	25
SA8.5	SA8.5C	8.5	9.44	11.50	1	15.9	31.45	5
SA8.5A	SA8.5CA	8.5	9.44	10.40	1	14.4	34.72	5
SA9.0	SA9.0C	9.0	10.00	12.20	1	16.9	29.59	5
SA9.0A	SA9.0CA	9.0	10.00	11.10	1	15.4	32.47	5
SA10	SA10C	10.0	11.10	13.60	1	18.8	26.60	5
SA10A	SA10CA	10.0	11.10	12.30	1	17.0	29.41	5
SA11	SA11C	11.0	12.20	14.90	1	20.1	24.88	5
SA11A	SA11CA	11.0	12.20	13.50	1	18.2	27.47	5
SA12	SA12C	12.0	13.30	16.30	1	22.0	22.73	5
SA12A	SA12CA	12.0	13.30	14.70	1	19.9	25.13	5
SA13	SA13C	13.0	14.40	17.60	1	23.8	21.01	5
SA13A	SA13CA	13.0	14.40	15.90	1	21.5	23.26	5
SA14	SA14C	14.0	15.60	19.10	1	25.8	19.38	5
SA14A	SA14CA	14.0	15.60	17.20	1	23.2	21.55	5
SA15	SA15C	15.0	16.70	20.40	1	26.9	18.59	5
SA15A	SA15CA	15.0	16.70	18.50	1	24.4	20.49	5
SA16	SA16C	16.0	17.80	21.80	1	28.8	17.36	5
SA16A	SA16CA	16.0	17.80	19.70	1	26.0	19.23	5
SA17	SA17C	17.0	18.90	23.10	1	30.5	16.39	5
SA17A	SA17CA	17.0	18.90	20.90	1	27.6	18.12	5
SA18	SA18C	18.0	20.00	24.40	1	32.2	15.53	5
SA18A	SA18CA	18.0	20.00	22.10	1	29.2	17.12	5
SA19	SA19C	19.0	21.13	25.76	1	34.0	14.70	5
SA19A	SA19CA	19.0	21.10	23.30	1	30.8	16.24	5
SA20	SA20C	20.0	22.20	27.10	1	35.8	13.97	5
SA20A	SA20CA	20.0	22.20	24.50	1	32.4	15.43	5
SA22	SA22C	22.0	24.40	29.80	1	39.4	12.69	5
SA22A	SA22CA	22.0	24.40	26.90	1	35.5	14.08	5
SA24	SA24C	24.0	26.70	32.60	1	43.0	11.63	5
SA24A	SA24CA	24.0	26.70	29.50	1	38.9	12.85	5
SA26	SA26C	26.0	28.90	35.30	1	46.6	10.73	5
SA26A	SA26CA	26.0	28.90	31.90	1	42.1	11.88	5
SA28	SA28C	28.0	31.10	38.00	1	50.0	10.00	5
SA28A	SA28CA	28.0	31.10	34.40	1	45.4	11.01	5
SA30	SA30C	30.0	33.30	40.70	1	53.5	9.35	5
SA30A	SA30CA	30.0	33.30	36.80	1	48.4	10.33	5
SA33	SA33C	33.0	36.70	44.90	1	59.0	8.47	5
SA33A	SA33CA	33.0	36.70	40.60	1	53.3	9.38	5
SA36	SA36C	36.0	40.00	48.90	1	64.3	7.78	5
SA36A	SA36CA	36.0	40.00	44.20	1	58.1	8.61	5
SA40	SA40C	40.0	44.40	54.30	1	71.4	7.00	5
SA40A	SA40CA	40.0	44.40	49.10	1	64.5	7.75	5

Axial Lead Transient Voltage Suppressors (TVS)
SA Series 5.0 To 190 V 500W
Electrical Characteristics (T_A=25°C unless otherwise noted)

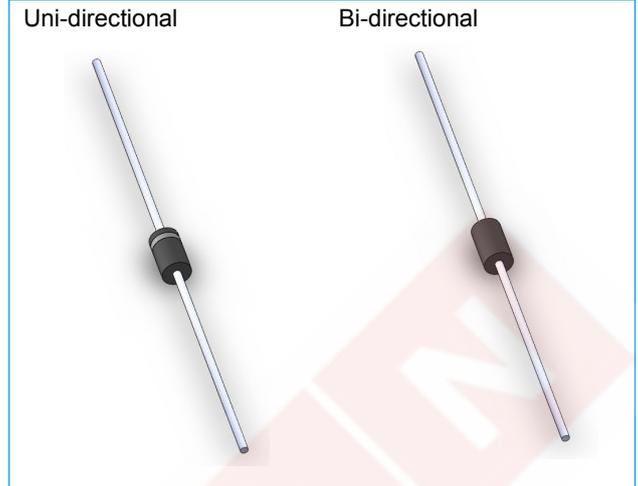
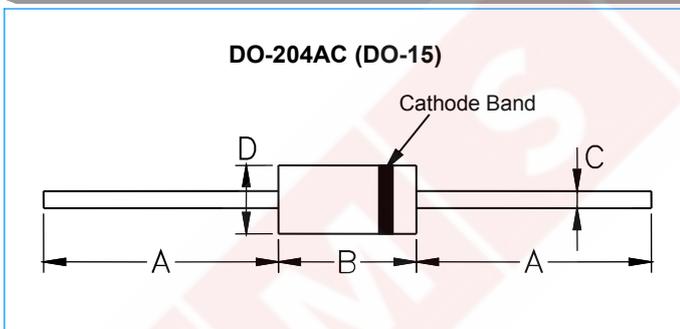
Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
SA43	SA43C	43.0	47.80	58.40	1	76.7	6.52	5
SA43A	SA43CA	43.0	47.80	52.80	1	69.4	7.20	5
SA45	SA45C	45.0	50.00	61.10	1	80.3	6.23	5
SA45A	SA45CA	45.0	50.00	55.30	1	72.7	6.88	5
SA48	SA48C	48.0	53.30	65.10	1	85.5	5.85	5
SA48A	SA48CA	48.0	53.30	58.90	1	77.4	6.46	5
SA51	SA51C	51.0	56.70	69.30	1	91.1	5.49	5
SA51A	SA51CA	51.0	56.70	62.70	1	82.4	6.07	5
SA54	SA54C	54.0	60.00	73.30	1	96.3	5.19	5
SA54A	SA54CA	54.0	60.00	66.30	1	87.1	5.74	5
SA58	SA58C	58.0	64.40	78.70	1	103.0	4.85	5
SA58A	SA58CA	58.0	64.40	71.20	1	93.6	5.34	5
SA60	SA60C	60.0	66.70	81.50	1	107.0	4.67	5
SA60A	SA60CA	60.0	66.70	73.70	1	96.8	5.17	5
SA64	SA64C	64.0	71.10	86.90	1	114.0	4.39	5
SA64A	SA64CA	64.0	71.10	78.60	1	103.0	4.85	5
SA70	SA70C	70.0	77.80	95.10	1	125.0	4.00	5
SA70A	SA70CA	70.0	77.80	86.00	1	113.0	4.42	5
SA75	SA75C	75.0	83.30	102.00	1	134.0	3.37	5
SA75A	SA75CA	75.0	83.30	92.10	1	121.0	4.13	5
SA78	SA78C	78.0	86.70	106.00	1	139.0	3.60	5
SA78A	SA78CA	78.0	86.70	95.80	1	126.0	3.97	5
SA80	SA80C	80.0	88.96	108.80	1	143.2	3.49	5
SA80A	SA80CA	80.0	88.80	97.60	1	129.6	3.86	5
SA85	SA85C	85.0	94.40	115.00	1	151.0	3.31	5
SA85A	SA85CA	85.0	94.40	104.00	1	137.0	3.65	5
SA90	SA90C	90.0	100.00	122.00	1	160.0	3.13	5
SA90A	SA90CA	90.0	100.00	111.00	1	146.0	3.42	5
SA100	SA100C	100.0	111.00	136.00	1	179.0	2.79	5
SA100A	SA100CA	100.0	111.00	123.00	1	162.0	3.09	5
SA110	SA110C	110.0	122.00	149.00	1	196.0	2.55	5
SA110A	SA110CA	110.0	122.00	135.00	1	177.0	2.82	5
SA120	SA120C	120.0	133.00	163.00	1	214.0	2.34	5
SA120A	SA120CA	120.0	133.00	147.00	1	193.0	2.59	5
SA130	SA130C	130.0	144.00	176.00	1	231.0	2.16	5
SA130A	SA130CA	130.0	144.00	159.00	1	209.0	2.39	5
SA140	SA140C	140.0	155.68	190.40	1	250.6	2.00	5
SA140A	SA140CA	140.0	155.00	171.00	1	226.8	2.20	5
SA150	SA150C	150.0	167.00	204.00	1	268.0	1.87	5
SA150A	SA150CA	150.0	167.00	185.00	1	243.0	2.06	5
SA160	SA160C	160.0	178.00	218.00	1	287.0	1.74	5
SA160A	SA160CA	160.0	178.00	197.00	1	259.0	1.93	5
SA170	SA170C	170.0	189.00	231.00	1	304.0	1.64	5
SA170A	SA170CA	170.0	189.00	209.00	1	275.0	1.82	5
SA180	SA180C	180.0	201.00	244.80	1	322.2	1.55	5
SA180A	SA180CA	180.0	201.00	220.00	1	291.6	1.71	5
SA190	SA190C	190.0	211.21	258.40	1	340.1	1.47	5
SA190A	SA190CA	190.0	211.00	232.00	1	307.8	1.62	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)
P6KE Series 6.8 To 600 V 600W
Features

- ◆ Glass passivated chip junction in DO-15 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 600W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


DO-204AC (DO-15)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.165	0.205	4.19	5.21
C	0.028	0.033	0.71	0.84
D	0.090	0.117	2.29	2.97

Axial Lead Transient Voltage Suppressors (TVS)
P6KE Series 6.8 To 600 V 600W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi		MIN	MAX				
P6KE6.8	P6KE6.8C	5.5	6.12	7.48	10	10.8	55.56	1000
P6KE6.8A	P6KE6.8CA	5.8	6.46	7.14	10	10.5	57.14	1000
P6KE7.5	P6KE7.5C	6.1	6.75	8.25	10	11.7	51.28	500
P6KE7.5A	P6KE7.5CA	6.4	7.13	7.88	10	11.3	53.10	500
P6KE8.2	P6KE8.2C	6.6	7.38	9.02	10	12.5	48.00	200
P6KE8.2A	P6KE8.2CA	7.0	7.79	8.61	10	12.1	49.59	200
P6KE9.1	P6KE9.1C	7.4	8.19	10.01	1	13.8	43.48	50
P6KE9.1A	P6KE9.1CA	7.8	8.65	9.56	1	13.4	44.78	50
P6KE10	P6KE10C	8.1	9.00	11.00	1	15.0	40.00	10
P6KE10A	P6KE10CA	8.6	9.50	10.50	1	14.5	41.38	10
P6KE11	P6KE11C	8.9	9.90	12.10	1	16.2	37.04	5
P6KE11A	P6KE11CA	9.4	10.45	11.55	1	15.6	38.46	5
P6KE12	P6KE12C	9.7	10.80	13.20	1	17.3	34.68	5
P6KE12A	P6KE12CA	10.2	11.40	12.60	1	16.7	35.93	5
P6KE13	P6KE13C	10.5	11.70	14.30	1	19.0	31.58	5
P6KE13A	P6KE13CA	11.1	12.35	13.65	1	18.2	32.97	5
P6KE15	P6KE15C	12.1	13.50	16.50	1	22.0	27.27	5
P6KE15A	P6KE15CA	12.8	14.25	15.75	1	21.2	28.30	5
P6KE16	P6KE16C	12.9	14.40	17.60	1	23.5	25.53	5
P6KE16A	P6KE16CA	13.6	15.20	16.80	1	22.5	26.67	5
P6KE18	P6KE18C	14.5	16.20	19.80	1	26.5	22.64	5
P6KE18A	P6KE18CA	15.3	17.10	18.90	1	25.2	23.81	5
P6KE20	P6KE20C	16.2	18.00	22.00	1	29.1	20.62	5
P6KE20A	P6KE20CA	17.1	19.00	21.00	1	27.7	21.66	5
P6KE22	P6KE22C	17.8	19.80	24.20	1	31.9	18.81	5
P6KE22A	P6KE22CA	18.8	20.90	23.10	1	30.6	19.61	5
P6KE24	P6KE24C	19.4	21.60	26.40	1	34.7	17.29	5
P6KE24A	P6KE24CA	20.5	22.80	25.20	1	33.2	18.07	5
P6KE27	P6KE27C	21.8	24.30	29.70	1	39.1	15.35	5
P6KE27A	P6KE27CA	23.1	25.65	28.35	1	37.5	16.00	5
P6KE30	P6KE30C	24.3	27.00	33.00	1	43.5	13.79	5
P6KE30A	P6KE30CA	25.6	28.50	31.50	1	41.4	14.49	5
P6KE33	P6KE33C	26.8	29.70	36.30	1	47.7	12.58	5
P6KE33A	P6KE33CA	28.2	31.35	34.65	1	45.7	13.13	5
P6KE36	P6KE36C	29.1	32.40	39.60	1	52.0	11.54	5
P6KE36A	P6KE36CA	30.8	34.20	37.80	1	49.9	12.02	5
P6KE39	P6KE39C	31.6	35.10	42.90	1	56.4	10.64	5
P6KE39A	P6KE39CA	33.3	37.05	40.95	1	53.9	11.13	5
P6KE43	P6KE43C	34.8	38.70	47.30	1	61.9	9.69	5
P6KE43A	P6KE43CA	36.8	40.85	45.15	1	59.3	10.12	5
P6KE47	P6KE47C	38.1	42.30	51.70	1	67.8	8.85	5
P6KE47A	P6KE47CA	40.2	44.65	49.35	1	64.8	9.26	5
P6KE51	P6KE51C	41.3	45.90	56.10	1	73.5	8.16	5
P6KE51A	P6KE51CA	43.6	48.45	53.55	1	70.1	8.56	5
P6KE56	P6KE56C	45.4	50.40	61.60	1	80.5	7.45	5
P6KE56A	P6KE56CA	47.8	53.20	58.80	1	77.0	7.79	5
P6KE62	P6KE62C	50.2	55.80	68.20	1	89.0	6.74	5
P6KE62A	P6KE62CA	53.0	58.90	65.10	1	85.0	7.06	5
P6KE68	P6KE68C	55.1	61.20	74.80	1	98.0	6.12	5
P6KE68A	P6KE68CA	58.1	64.60	71.40	1	92.0	6.52	5
P6KE75	P6KE75C	60.7	67.50	82.50	1	108.0	5.56	5
P6KE75A	P6KE75CA	64.1	71.25	78.75	1	103.0	5.83	5
P6KE82	P6KE82C	66.4	73.80	90.20	1	118.0	5.08	5
P6KE82A	P6KE82CA	70.1	77.90	86.10	1	113.0	5.31	5

Axial Lead Transient Voltage Suppressors (TVS)
P6KE Series 6.8 To 600 V 600W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi		MIN	MAX				
P6KE91	P6KE91C	73.7	81.90	100.10	1	131.0	4.58	5
P6KE91A	P6KE91CA	77.8	86.45	95.55	1	125.0	4.80	5
P6KE100	P6KE100C	81.0	90.00	110.00	1	144.0	4.17	5
P6KE100A	P6KE100CA	85.5	95.00	105.00	1	137.0	4.38	5
P6KE110	P6KE110C	89.2	99.00	121.00	1	158.0	3.80	5
P6KE110A	P6KE110CA	94.0	104.50	115.50	1	152.0	3.95	5
P6KE120	P6KE120C	97.2	108.00	132.00	1	173.0	3.47	5
P6KE120A	P6KE120CA	102.0	114.00	126.00	1	165.0	3.64	5
P6KE130	P6KE130C	105.0	117.00	143.00	1	187.0	3.21	5
P6KE130A	P6KE130CA	111.0	123.50	136.50	1	179.0	3.35	5
P6KE150	P6KE150C	121.0	135.00	165.00	1	215.0	2.79	5
P6KE150A	P6KE150CA	128.0	142.50	157.50	1	207.0	2.90	5
P6KE160	P6KE160C	130.0	144.00	176.00	1	230.0	2.61	5
P6KE160A	P6KE160CA	136.0	152.00	168.00	1	219.0	2.74	5
P6KE170	P6KE170C	138.0	153.00	187.00	1	244.0	2.46	5
P6KE170A	P6KE170CA	145.0	161.50	178.50	1	234.0	2.56	5
P6KE180	P6KE180C	146.0	162.00	198.00	1	258.0	2.33	5
P6KE180A	P6KE180CA	154.0	171.00	189.00	1	246.0	2.44	5
P6KE200	P6KE200C	162.0	180.00	220.00	1	287.0	2.09	5
P6KE200A	P6KE200CA	171.0	190.00	210.00	1	274.0	2.19	5
P6KE220	P6KE220C	175.0	198.00	242.00	1	344.0	1.74	5
P6KE220A	P6KE220CA	185.0	209.00	231.00	1	328.0	1.83	5
P6KE250	P6KE250C	202.0	225.00	275.00	1	360.0	1.67	5
P6KE250A	P6KE250CA	214.0	237.50	262.50	1	344.0	1.74	5
P6KE300	P6KE300C	243.0	270.00	330.00	1	430.0	1.40	5
P6KE300A	P6KE300CA	256.0	285.00	315.00	1	414.0	1.45	5
P6KE350	P6KE350C	284.0	315.00	385.00	1	504.0	1.19	5
P6KE350A	P6KE350CA	299.3	332.50	367.50	1	482.0	1.24	5
P6KE380	P6KE380C	308.6	342.00	418.00	1	547.2	1.10	5
P6KE380A	P6KE380CA	324.9	361.00	399.00	1	524.4	1.14	5
P6KE400	P6KE400C	324.8	360.00	440.00	1	576.0	1.05	5
P6KE400A	P6KE400CA	342.0	380.00	420.00	1	552.0	1.09	5
P6KE440	P6KE440C	357.3	396.00	484.00	1	633.6	0.95	5
P6KE440A	P6KE440CA	376.2	418.00	462.00	1	607.2	0.99	5
P6KE500	P6KE500C	406.0	450.00	550.00	1	720.0	0.83	5
P6KE500A	P6KE500CA	427.5	475.00	525.00	1	690.0	0.87	5
P6KE520	P6KE520C	422.2	468.00	572.00	1	748.8	0.80	5
P6KE520A	P6KE520CA	444.6	494.00	546.00	1	717.6	0.84	5
P6KE550	P6KE550C	446.6	495.00	605.00	1	792.0	0.76	5
P6KE550A	P6KE550CA	470.3	522.50	577.50	1	759.0	0.79	5
P6KE600	P6KE600C	487.2	540.00	660.00	1	864.0	0.69	5
P6KE600A	P6KE600CA	513.0	570.00	630.00	1	828.0	0.72	5

Note:

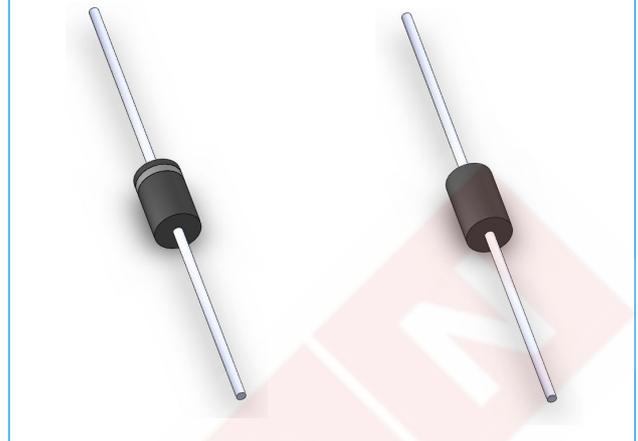
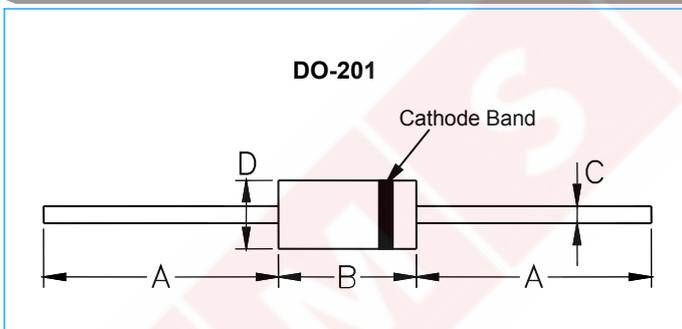
1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)
1.5KE Series 6.8 To 600 V 1500W
Features

- ◆ Glass passivated chip junction in DO-15 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 600W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Uni-directional

Bi-directional


DO-201
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.285	0.375	7.24	9.53
C	0.038	0.042	0.97	1.07
D	0.189	0.209	4.79	5.30

Axial Lead Transient Voltage Suppressors (TVS)
1.5KE Series 6.8 To 600 V 1500W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
1.5KE6.8	1.5KE6.8C	5.5	6.12	7.48	10	10.8	138.89	1000
1.5KE6.8A	1.5KE6.8CA	5.8	6.46	7.14	10	10.5	142.86	1000
1.5KE7.5	1.5KE7.5C	6.1	6.75	8.25	10	11.7	128.21	500
1.5KE7.5A	1.5KE7.5CA	6.4	7.13	7.88	10	11.3	132.74	500
1.5KE8.2	1.5KE8.2C	6.6	7.38	9.02	10	12.5	120.00	200
1.5KE8.2A	1.5KE8.2CA	7.0	7.79	8.61	10	12.1	123.97	200
1.5KE9.1	1.5KE9.1C	7.4	8.19	10.01	1	13.8	108.70	50
1.5KE9.1A	1.5KE9.1CA	7.8	8.65	9.56	1	13.4	111.94	50
1.5KE10	1.5KE10C	8.1	9.00	11.00	1	15.0	100.00	10
1.5KE10A	1.5KE10CA	8.6	9.50	10.50	1	14.5	103.45	10
1.5KE11	1.5KE11C	8.9	9.90	12.10	1	16.2	92.59	5
1.5KE11A	1.5KE11CA	9.4	10.45	11.55	1	15.6	96.15	5
1.5KE12	1.5KE12C	9.7	10.80	13.20	1	17.3	86.71	5
1.5KE12A	1.5KE12CA	10.2	11.40	12.60	1	16.7	89.82	5
1.5KE13	1.5KE13C	10.5	11.70	14.30	1	19.0	78.95	5
1.5KE13A	1.5KE13CA	11.1	12.35	13.65	1	18.2	82.42	5
1.5KE15	1.5KE15C	12.1	13.50	16.50	1	22.0	68.18	5
1.5KE15A	1.5KE15CA	12.8	14.25	15.75	1	21.2	70.75	5
1.5KE16	1.5KE16C	12.9	14.40	17.60	1	23.5	63.83	5
1.5KE16A	1.5KE16CA	13.6	15.20	16.80	1	22.5	66.67	5
1.5KE18	1.5KE18C	14.5	16.20	19.80	1	26.5	56.60	5
1.5KE18A	1.5KE18CA	15.3	17.10	18.90	1	25.2	59.52	5
1.5KE20	1.5KE20C	16.2	18.00	22.00	1	29.1	51.55	5
1.5KE20A	1.5KE20CA	17.1	19.00	21.00	1	27.7	54.15	5
1.5KE22	1.5KE22C	17.8	19.80	24.20	1	31.9	47.02	5
1.5KE22A	1.5KE22CA	18.8	20.90	23.10	1	30.6	49.02	5
1.5KE24	1.5KE24C	19.4	21.60	26.40	1	34.7	43.23	5
1.5KE24A	1.5KE24CA	20.5	22.80	25.20	1	33.2	45.18	5
1.5KE27	1.5KE27C	21.8	24.30	29.70	1	39.1	38.36	5
1.5KE27A	1.5KE27CA	23.1	25.65	28.35	1	37.5	40.00	5
1.5KE30	1.5KE30C	24.3	27.00	33.00	1	43.5	34.48	5
1.5KE30A	1.5KE30CA	25.6	28.50	31.50	1	41.4	36.23	5
1.5KE33	1.5KE33C	26.8	29.70	36.30	1	47.7	31.45	5
1.5KE33A	1.5KE33CA	28.2	31.35	34.65	1	45.7	32.82	5
1.5KE36	1.5KE36C	29.1	32.40	39.60	1	52.0	28.85	5
1.5KE36A	1.5KE36CA	30.8	34.20	37.80	1	49.9	30.06	5
1.5KE39	1.5KE39C	31.6	35.10	42.90	1	56.4	36.60	5
1.5KE39A	1.5KE39CA	33.3	37.05	40.95	1	53.9	27.83	5
1.5KE43	1.5KE43C	34.8	38.70	47.30	1	61.9	24.23	5
1.5KE43A	1.5KE43CA	36.8	40.85	45.15	1	59.3	25.30	5
1.5KE47	1.5KE47C	38.1	42.30	51.70	1	67.8	22.12	5
1.5KE47A	1.5KE47CA	40.2	44.65	49.35	1	64.8	23.15	5
1.5KE51	1.5KE51C	41.3	45.90	56.10	1	73.5	20.41	5
1.5KE51A	1.5KE51CA	43.6	48.45	53.55	1	70.1	21.40	5
1.5KE56	1.5KE56C	45.4	50.40	61.60	1	80.5	18.63	5
1.5KE56A	1.5KE56CA	47.8	53.20	58.80	1	77.0	19.48	5
1.5KE62	1.5KE62C	50.2	55.80	68.20	1	89.0	16.85	5
1.5KE62A	1.5KE62CA	53.0	58.90	65.10	1	85.0	17.65	5
1.5KE68	1.5KE68C	55.1	61.20	74.80	1	98.0	15.31	5
1.5KE68A	1.5KE68CA	58.1	64.60	71.40	1	92.0	16.30	5
1.5KE75	1.5KE75C	60.7	67.50	82.50	1	108.0	13.89	5
1.5KE75A	1.5KE75CA	64.1	71.25	78.75	1	103.0	14.56	5
1.5KE82	1.5KE82C	66.4	73.80	90.20	1	118.0	12.71	5
1.5KE82A	1.5KE82CA	70.1	77.90	86.10	1	113.0	13.27	5

Axial Lead Transient Voltage Suppressors (TVS)
1.5KE Series 6.8 To 600 V 1500W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
1.5KE91	1.5KE91C	73.7	81.90	100.10	1	131.0	11.45	5
1.5KE91A	1.5KE91CA	77.8	86.45	95.55	1	125.0	12.00	5
1.5KE100	1.5KE100C	81.0	90.00	110.00	1	144.0	10.42	5
1.5KE100A	1.5KE100CA	85.5	95.00	105.00	1	137.0	10.95	5
1.5KE110	1.5KE110C	89.2	99.00	121.00	1	158.0	9.49	5
1.5KE110A	1.5KE110CA	94.0	104.50	115.50	1	152.0	9.87	5
1.5KE120	1.5KE120C	97.2	108.00	132.00	1	173.0	8.67	5
1.5KE120A	1.5KE120CA	102.0	114.00	126.00	1	165.0	9.09	5
1.5KE130	1.5KE130C	105.0	117.00	143.00	1	187.0	8.02	5
1.5KE130A	1.5KE130CA	111.0	123.50	136.50	1	179.0	8.38	5
1.5KE150	1.5KE150C	121.0	135.00	165.00	1	215.0	6.98	5
1.5KE150A	1.5KE150CA	128.0	142.50	157.50	1	207.0	7.25	5
1.5KE160	1.5KE160C	130.0	144.00	176.00	1	230.0	6.52	5
1.5KE160A	1.5KE160CA	136.0	152.00	168.00	1	219.0	6.85	5
1.5KE170	1.5KE170C	138.0	153.00	187.00	1	244.0	6.15	5
1.5KE170A	1.5KE170CA	145.0	161.50	178.50	1	234.0	6.41	5
1.5KE180	1.5KE180C	146.0	162.00	198.00	1	258.0	5.81	5
1.5KE180A	1.5KE180CA	154.0	171.00	189.00	1	246.0	6.10	5
1.5KE200	1.5KE200C	162.0	180.00	220.00	1	287.0	5.23	5
1.5KE200A	1.5KE200CA	171.0	190.00	210.00	1	274.0	5.47	5
1.5KE220	1.5KE220C	175.0	198.00	242.00	1	344.0	4.36	5
1.5KE220A	1.5KE220CA	185.0	209.00	231.00	1	328.0	4.57	5
1.5KE250	1.5KE250C	202.0	225.00	275.00	1	360.0	4.17	5
1.5KE250A	1.5KE250CA	214.0	237.50	262.50	1	344.0	4.36	5
1.5KE300	1.5KE300C	243.0	270.00	330.00	1	430.0	3.49	5
1.5KE300A	1.5KE300CA	256.0	285.00	315.00	1	414.0	3.62	5
1.5KE350	1.5KE350C	284.0	315.00	385.00	1	504.0	2.98	5
1.5KE350A	1.5KE350CA	299.3	332.50	367.50	1	482.0	3.11	5
1.5KE380	1.5KE380C	308.6	342.00	418.00	1	547.2	2.74	5
1.5KE380A	1.5KE380CA	324.9	361.00	399.00	1	524.4	2.86	5
1.5KE400	1.5KE400C	324.8	360.00	440.00	1	576.0	2.60	5
1.5KE400A	1.5KE400CA	342.0	380.00	420.00	1	552.0	2.72	5
1.5KE440	1.5KE440C	357.3	396.00	484.00	1	633.6	2.37	5
1.5KE440A	1.5KE440CA	376.2	418.00	462.00	1	607.2	2.47	5
1.5KE500	1.5KE500C	406.0	450.00	550.00	1	720.0	2.08	5
1.5KE500A	1.5KE500CA	427.5	475.00	525.00	1	690.0	2.17	5
1.5KE520	1.5KE520C	422.2	468.00	572.00	1	748.8	2.00	5
1.5KE520A	1.5KE520CA	444.6	494.00	546.00	1	717.6	2.09	5
1.5KE550	1.5KE550C	446.6	495.00	605.00	1	792.0	1.89	5
1.5KE550A	1.5KE550CA	470.3	522.50	577.50	1	759.0	1.98	5
1.5KE600	1.5KE600C	487.2	540.00	660.00	1	864.0	1.74	5
1.5KE600A	1.5KE600CA	513.0	570.00	630.00	1	828.0	1.81	5

Note:

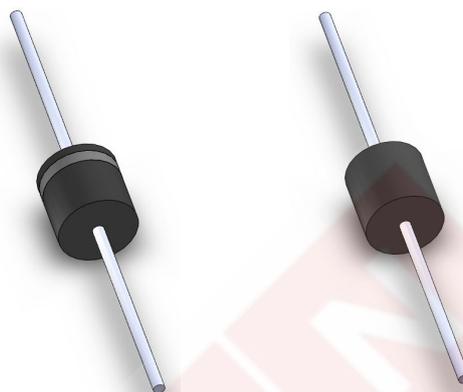
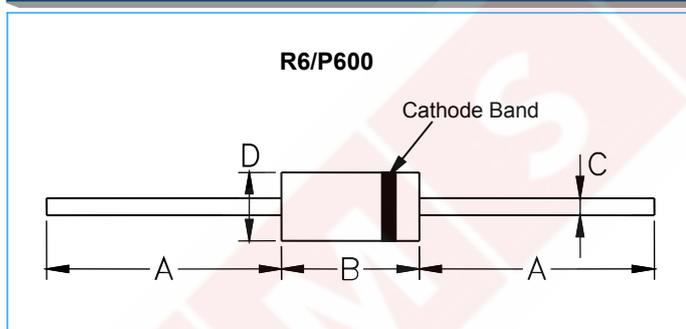
1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)
3KP Series 5.0 To 190 V 3000W
Features

- ◆ Glass passivated chip junction in P600 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 3000W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Uni-directional

Bi-directional


R6/P600
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.64	9.14
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.64	9.14

Axial Lead Transient Voltage Suppressors (TVS)
3KP Series 5.0 To 190 V 3000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _c @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
			MIN	MAX				
Uni	Bi							
3KP5.0	3KP5.0C	5.0	6.40	7.30	50	9.6	312.50	1000
3KP5.0A	3KP5.0CA	5.0	6.40	7.00	50	9.2	326.09	1000
3KP6.0	3KP6.0C	6.0	6.67	8.15	50	11.4	263.16	1000
3KP6.0A	3KP6.0CA	6.0	6.67	7.37	50	10.3	291.26	1000
3KP6.5	3KP6.5C	6.5	7.22	8.82	50	12.3	243.90	500
3KP6.5A	3KP6.5CA	6.5	7.22	7.98	50	11.2	267.86	500
3KP7.0	3KP7.0C	7.0	7.78	9.51	50	13.3	225.56	200
3KP7.0A	3KP7.0CA	7.0	7.78	8.60	50	12.0	250.00	200
3KP7.5	3KP7.5C	7.5	8.33	10.20	5	14.3	209.79	100
3KP7.5A	3KP7.5CA	7.5	8.33	9.21	5	12.9	232.56	100
3KP8.0	3KP8.0C	8.0	8.89	10.90	5	15.0	200.00	50
3KP8.0A	3KP8.0CA	8.0	8.89	9.83	5	13.6	220.59	50
3KP8.5	3KP8.5C	8.5	9.44	11.50	5	15.9	188.68	25
3KP8.5A	3KP8.5CA	8.5	9.44	10.40	5	14.4	208.33	25
3KP9.0	3KP9.0C	9.0	10.00	12.20	5	16.9	177.51	10
3KP9.0A	3KP9.0CA	9.0	10.00	11.10	5	15.4	194.81	10
3KP10	3KP10C	10.0	11.10	13.60	5	18.8	159.57	5
3KP10A	3KP10CA	10.0	11.10	12.30	5	17.0	176.47	5
3KP11	3KP11C	11.0	12.20	14.90	5	20.1	149.25	5
3KP11A	3KP11CA	11.0	12.20	13.50	5	18.2	164.84	5
3KP12	3KP12C	12.0	13.30	16.30	5	22.0	136.36	5
3KP12A	3KP12CA	12.0	13.30	14.70	5	19.9	150.75	5
3KP13	3KP13C	13.0	14.40	17.60	5	23.8	126.05	5
3KP13A	3KP13CA	13.0	14.40	15.90	5	21.5	139.53	5
3KP14	3KP14C	14.0	15.60	19.10	5	25.8	116.28	5
3KP14A	3KP14CA	14.0	15.60	17.20	5	23.2	129.31	5
3KP15	3KP15C	15.0	16.70	20.40	5	26.9	111.52	5
3KP15A	3KP15CA	15.0	16.70	18.50	5	24.4	122.95	5
3KP16	3KP16C	16.0	17.80	21.80	5	28.8	104.17	5
3KP16A	3KP16CA	16.0	17.80	19.70	5	26.0	115.38	5
3KP17	3KP17C	17.0	18.90	23.10	5	30.5	98.36	5
3KP17A	3KP17CA	17.0	18.90	20.90	5	27.6	108.70	5
3KP18	3KP18C	18.0	20.00	24.40	5	32.2	93.17	5
3KP18A	3KP18CA	18.0	20.00	22.10	5	29.2	102.74	5
3KP19	3KP19C	19.0	21.13	25.76	5	34.0	88.21	5
3KP19A	3KP19CA	19.0	21.10	23.30	5	30.8	97.47	5
3KP20	3KP20C	20.0	22.20	27.10	5	35.8	83.80	5
3KP20A	3KP20CA	20.0	22.20	24.50	5	32.4	92.59	5
3KP22	3KP22C	22.0	24.40	29.80	5	39.4	76.14	5
3KP22A	3KP22CA	22.0	24.40	26.90	5	35.5	84.51	5
3KP24	3KP24C	24.0	26.70	32.60	5	43.0	69.77	5
3KP24A	3KP24CA	24.0	26.70	29.50	5	38.9	77.12	5
3KP26	3KP26C	26.0	28.90	35.30	5	46.6	64.38	5
3KP26A	3KP26CA	26.0	28.90	31.90	5	42.1	71.26	5
3KP28	3KP28C	28.0	31.10	38.00	5	50.0	60.00	5
3KP28A	3KP28CA	28.0	31.10	34.40	5	45.4	66.08	5
3KP30	3KP30C	30.0	33.30	40.70	5	53.5	56.07	5
3KP30A	3KP30CA	30.0	33.30	36.80	5	48.4	61.98	5
3KP33	3KP33C	33.0	36.70	44.90	5	59.0	50.85	5
3KP33A	3KP33CA	33.0	36.70	40.60	5	53.3	56.29	5
3KP36	3KP36C	36.0	40.00	48.90	5	64.3	46.66	5
3KP36A	3KP36CA	36.0	40.00	44.20	5	58.1	51.64	5
3KP40	3KP40C	40.0	44.40	54.30	5	71.4	42.02	5
3KP40A	3KP40CA	40.0	44.40	49.10	5	64.5	46.51	5
3KP43	3KP43C	43.0	47.80	58.40	5	76.7	39.11	5
3KP43A	3KP43CA	43.0	47.80	52.80	5	69.4	43.23	5

Axial Lead Transient Voltage Suppressors (TVS)
3KP Series 5.0 To 190 V 3000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

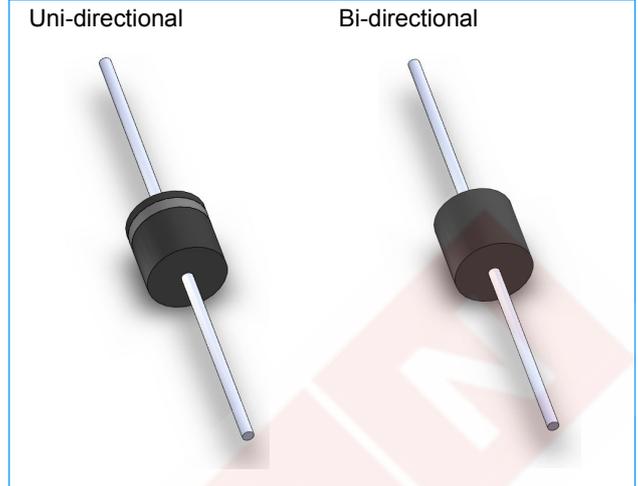
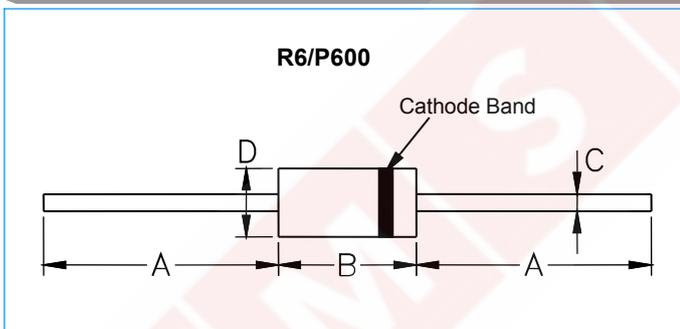
Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
			MIN	MAX				
Uni	Bi							
3KP45	3KP45C	45.0	50.00	61.10	5	80.3	37.36	5
3KP45A	3KP45CA	45.0	50.00	55.30	5	72.7	41.27	5
3KP48	3KP48C	48.0	53.30	65.10	5	85.5	35.09	5
3KP48A	3KP48CA	48.0	53.30	58.90	5	77.4	38.76	5
3KP51	3KP51C	51.0	56.70	69.30	5	91.1	32.93	5
3KP51A	3KP51CA	51.0	56.70	62.70	5	82.4	36.41	5
3KP54	3KP54C	54.0	60.00	73.30	5	96.3	31.15	5
3KP54A	3KP54CA	54.0	60.00	66.30	5	87.1	34.44	5
3KP58	3KP58C	58.0	64.40	78.70	5	103.0	29.13	5
3KP58A	3KP58CA	58.0	64.40	71.20	5	93.6	32.05	5
3KP60	3KP60C	60.0	66.70	81.50	5	107.0	28.04	5
3KP60A	3KP60CA	60.0	66.70	73.70	5	96.8	30.99	5
3KP64	3KP64C	64.0	71.10	86.90	5	114.0	26.32	5
3KP64A	3KP64CA	64.0	71.10	78.60	5	103.0	29.13	5
3KP70	3KP70C	70.0	77.80	95.10	5	125.0	24.00	5
3KP70A	3KP70CA	70.0	77.80	86.00	5	113.0	26.55	5
3KP75	3KP75C	75.0	83.30	102.00	5	134.0	22.39	5
3KP75A	3KP75CA	75.0	83.30	92.10	5	121.0	24.79	5
3KP78	3KP78C	78.0	86.70	106.00	5	139.0	21.58	5
3KP78A	3KP78CA	78.0	86.70	95.80	5	126.0	23.81	5
3KP80	3KP80C	80.0	88.96	108.80	5	143.2	20.95	5
3KP80A	3KP80CA	80.0	88.80	97.60	5	129.6	23.15	5
3KP85	3KP85C	85.0	94.40	115.00	5	151.0	19.87	5
3KP85A	3KP85CA	85.0	94.40	104.00	5	137.0	21.90	5
3KP90	3KP90C	90.0	100.00	122.00	5	160.0	18.75	5
3KP90A	3KP90CA	90.0	100.00	111.00	5	146.0	20.55	5
3KP100	3KP100C	100.0	111.00	136.00	5	179.0	16.76	5
3KP100A	3KP100CA	100.0	111.00	123.00	5	162.0	18.52	5
3KP110	3KP110C	110.0	122.00	149.00	5	196.0	15.31	5
3KP110A	3KP110CA	110.0	122.00	135.00	5	177.0	16.95	5
3KP120	3KP120C	120.0	133.00	163.00	5	214.0	14.02	5
3KP120A	3KP120CA	120.0	133.00	147.00	5	193.0	15.54	5
3KP130	3KP130C	130.0	144.00	176.00	5	231.0	12.99	5
3KP130A	3KP130CA	130.0	144.00	159.00	5	209.0	14.35	5
3KP140	3KP140C	140.0	155.68	190.40	5	250.6	11.97	5
3KP140A	3KP140CA	140.0	155.00	171.00	5	226.8	13.23	5
3KP150	3KP150C	150.0	167.00	204.00	5	268.0	11.19	5
3KP150A	3KP150CA	150.0	167.00	185.00	5	243.0	12.35	5
3KP160	3KP160C	160.0	178.00	218.00	5	287.0	10.45	5
3KP160A	3KP160CA	160.0	178.00	197.00	5	259.0	11.58	5
3KP170	3KP170C	170.0	189.00	231.00	5	304.0	9.87	5
3KP170A	3KP170CA	170.0	189.00	209.00	5	275.0	10.91	5
3KP180	3KP180C	180.0	201.00	244.80	5	322.2	9.31	5
3KP180A	3KP180CA	180.0	201.00	220.00	5	291.6	10.29	5
3KP190	3KP190C	190.0	211.21	258.40	5	340.1	8.82	5
3KP190A	3KP190CA	190.0	211.00	232.00	5	307.8	9.75	5

Note:

1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)
5KP Series 5.0 To 190 V 5000W
Features

- ◆ Glass passivated chip junction in P600 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 5000W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)


R6/P600
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.64	9.14
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.64	9.14

Axial Lead Transient Voltage Suppressors (TVS)
5KP Series 5.0 To 190 V 5000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _c @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
5KP5.0	5KP5.0C	5.0	6.40	7.30	10	9.6	520.83	800
5KP5.0A	5KP5.0CA	5.0	6.40	7.00	10	9.2	543.48	800
5KP6.0	5KP6.0C	6.0	6.67	8.15	10	11.4	438.60	800
5KP6.0A	5KP6.0CA	6.0	6.67	7.37	10	10.3	485.44	800
5KP6.5	5KP6.5C	6.5	7.22	8.82	10	12.3	406.50	500
5KP6.5A	5KP6.5CA	6.5	7.22	7.98	10	11.2	446.43	500
5KP7.0	5KP7.0C	7.0	7.78	9.51	10	13.3	375.94	200
5KP7.0A	5KP7.0CA	7.0	7.78	8.60	10	12.0	416.67	200
5KP7.5	5KP7.5C	7.5	8.33	10.20	1	14.3	349.65	100
5KP7.5A	5KP7.5CA	7.5	8.33	9.21	1	12.9	387.60	100
5KP8.0	5KP8.0C	8.0	8.89	10.90	1	15.0	333.33	50
5KP8.0A	5KP8.0CA	8.0	8.89	9.83	1	13.6	367.65	50
5KP8.5	5KP8.5C	8.5	9.44	11.50	1	15.9	314.47	20
5KP8.5A	5KP8.5CA	8.5	9.44	10.40	1	14.4	347.22	20
5KP9.0	5KP9.0C	9.0	10.00	12.20	1	16.9	295.86	10
5KP9.0A	5KP9.0CA	9.0	10.00	11.10	1	15.4	324.68	10
5KP10	5KP10C	10.0	11.10	13.60	1	18.8	265.96	5
5KP10A	5KP10CA	10.0	11.10	12.30	1	17.0	294.12	5
5KP11	5KP11C	11.0	12.20	14.90	1	20.1	248.76	5
5KP11A	5KP11CA	11.0	12.20	13.50	1	18.2	274.73	5
5KP12	5KP12C	12.0	13.30	16.30	1	22.0	227.27	5
5KP12A	5KP12CA	12.0	13.30	14.70	1	19.9	251.26	5
5KP13	5KP13C	13.0	14.40	17.60	1	23.8	210.08	5
5KP13A	5KP13CA	13.0	14.40	15.90	1	21.5	232.56	5
5KP14	5KP14C	14.0	15.60	19.10	1	25.8	193.80	5
5KP14A	5KP14CA	14.0	15.60	17.20	1	23.2	215.52	5
5KP15	5KP15C	15.0	16.70	20.40	1	26.9	185.87	5
5KP15A	5KP15CA	15.0	16.70	18.50	1	24.4	204.92	5
5KP16	5KP16C	16.0	17.80	21.80	1	28.8	173.61	5
5KP16A	5KP16CA	16.0	17.80	19.70	1	26.0	192.31	5
5KP17	5KP17C	17.0	18.90	23.10	1	30.5	163.93	5
5KP17A	5KP17CA	17.0	18.90	20.90	1	27.6	181.16	5
5KP18	5KP18C	18.0	20.00	24.40	1	32.2	155.28	5
5KP18A	5KP18CA	18.0	20.00	22.10	1	29.2	171.23	5
5KP19	5KP19C	19.0	21.13	25.76	1	34.0	147.02	5
5KP19A	5KP19CA	19.0	21.10	23.30	1	30.8	162.44	5
5KP20	5KP20C	20.0	22.20	27.10	1	35.8	139.66	5
5KP20A	5KP20CA	20.0	22.20	24.50	1	32.4	154.32	5
5KP22	5KP22C	22.0	24.40	29.80	1	39.4	126.90	5
5KP22A	5KP22CA	22.0	24.40	26.90	1	35.5	140.85	5
5KP24	5KP24C	24.0	26.70	32.60	1	43.0	116.28	5
5KP24A	5KP24CA	24.0	26.70	29.50	1	38.9	128.53	5
5KP26	5KP26C	26.0	28.90	35.30	1	46.6	107.30	5
5KP26A	5KP26CA	26.0	28.90	31.90	1	42.1	118.76	5
5KP28	5KP28C	28.0	31.10	38.00	1	50.0	100.00	5
5KP28A	5KP28CA	28.0	31.10	34.40	1	45.4	110.13	5
5KP30	5KP30C	30.0	33.30	40.70	1	53.5	93.46	5
5KP30A	5KP30CA	30.0	33.30	36.80	1	48.4	103.31	5
5KP33	5KP33C	33.0	36.70	44.90	1	59.0	84.75	5
5KP33A	5KP33CA	33.0	36.70	40.60	1	53.3	93.81	5
5KP36	5KP36C	36.0	40.00	48.90	1	64.3	77.76	5
5KP36A	5KP36CA	36.0	40.00	44.20	1	58.1	86.06	5
5KP40	5KP40C	40.0	44.40	54.30	1	71.4	70.03	5
5KP40A	5KP40CA	40.0	44.40	49.10	1	64.5	77.52	5
5KP43	5KP43C	43.0	47.80	58.40	1	76.7	65.19	5
5KP43A	5KP43CA	43.0	47.80	52.80	1	69.4	72.05	5

Axial Lead Transient Voltage Suppressors (TVS)
5KP Series 5.0 To 190 V 5000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi		MIN	MAX				
5KP45	5KP45C	45.0	50.00	61.10	1	80.3	62.27	5
5KP45A	5KP45CA	45.0	50.00	55.30	1	72.7	68.78	5
5KP48	5KP48C	48.0	53.30	65.10	1	85.5	58.48	5
5KP48A	5KP48CA	48.0	53.30	58.90	1	77.4	64.60	5
5KP51	5KP51C	51.0	56.70	69.30	1	91.1	54.88	5
5KP51A	5KP51CA	51.0	56.70	62.70	1	82.4	60.68	5
5KP54	5KP54C	54.0	60.00	73.30	1	96.3	51.92	5
5KP54A	5KP54CA	54.0	60.00	66.30	1	87.1	57.41	5
5KP58	5KP58C	58.0	64.40	78.70	1	103.0	48.54	5
5KP58A	5KP58CA	58.0	64.40	71.20	1	93.6	53.42	5
5KP60	5KP60C	60.0	66.70	81.50	1	107.0	46.73	5
5KP60A	5KP60CA	60.0	66.70	73.70	1	96.8	51.65	5
5KP64	5KP64C	64.0	71.10	86.90	1	114.0	43.86	5
5KP64A	5KP64CA	64.0	71.10	78.60	1	103.0	48.54	5
5KP70	5KP70C	70.0	77.80	95.10	1	125.0	40.00	5
5KP70A	5KP70CA	70.0	77.80	86.00	1	113.0	44.25	5
5KP75	5KP75C	75.0	83.30	102.00	1	134.0	37.31	5
5KP75A	5KP75CA	75.0	83.30	92.10	1	121.0	41.32	5
5KP78	5KP78C	78.0	86.70	106.00	1	139.0	35.97	5
5KP78A	5KP78CA	78.0	86.70	95.80	1	126.0	39.68	5
5KP80	5KP80C	80.0	88.96	108.80	1	143.2	34.92	5
5KP80A	5KP80CA	80.0	88.80	97.60	1	129.6	38.58	5
5KP85	5KP85C	85.0	94.40	115.00	1	151.0	33.11	5
5KP85A	5KP85CA	85.0	94.40	104.00	1	137.0	36.50	5
5KP90	5KP90C	90.0	100.00	122.00	1	160.0	31.25	5
5KP90A	5KP90CA	90.0	100.00	111.00	1	146.0	34.25	5
5KP100	5KP100C	100.0	111.00	136.00	1	179.0	27.93	5
5KP100A	5KP100CA	100.0	111.00	123.00	1	162.0	30.86	5
5KP110	5KP110C	110.0	122.00	149.00	1	196.0	25.51	5
5KP110A	5KP110CA	110.0	122.00	135.00	1	177.0	28.25	5
5KP120	5KP120C	120.0	133.00	163.00	1	214.0	23.36	5
5KP120A	5KP120CA	120.0	133.00	147.00	1	193.0	25.91	5
5KP130	5KP130C	130.0	144.00	176.00	1	231.0	21.65	5
5KP130A	5KP130CA	130.0	144.00	159.00	1	209.0	23.92	5
5KP140	5KP140C	140.0	155.68	190.40	1	250.6	19.95	5
5KP140A	5KP140CA	140.0	155.00	171.00	1	226.8	22.05	5
5KP150	5KP150C	150.0	167.00	204.00	1	268.0	18.66	5
5KP150A	5KP150CA	150.0	167.00	185.00	1	243.0	20.58	5
5KP160	5KP160C	160.0	178.00	218.00	1	287.0	17.42	5
5KP160A	5KP160CA	160.0	178.00	197.00	1	259.0	19.31	5
5KP170	5KP170C	170.0	189.00	231.00	1	304.0	16.45	5
5KP170A	5KP170CA	170.0	189.00	209.00	1	275.0	18.18	5
5KP180	5KP180C	180.0	201.00	244.80	1	322.2	15.52	5
5KP180A	5KP180CA	180.0	201.00	220.00	1	291.6	17.15	5
5KP190	5KP190C	190.0	211.21	258.40	1	340.1	14.70	5
5KP190A	5KP190CA	190.0	211.00	232.00	1	307.8	16.24	5

Note:

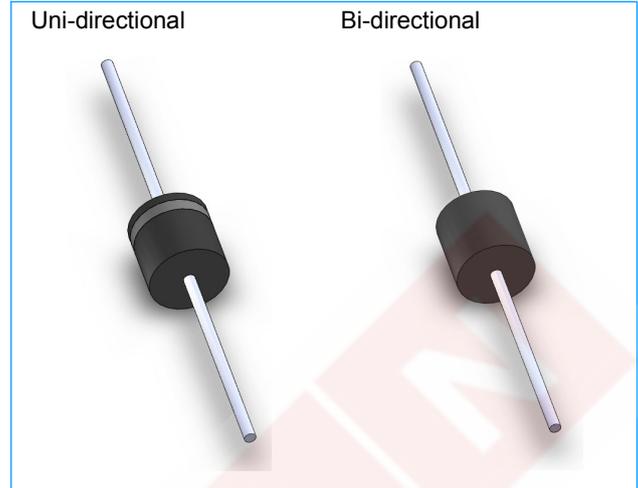
1. Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device
2. Add suffix 'C' or 'CA' after part number to specify Bi-directional devices
3. For Bi-Directional devices having V_R of 10 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)

8KP Series 24 To 43 V 8000W

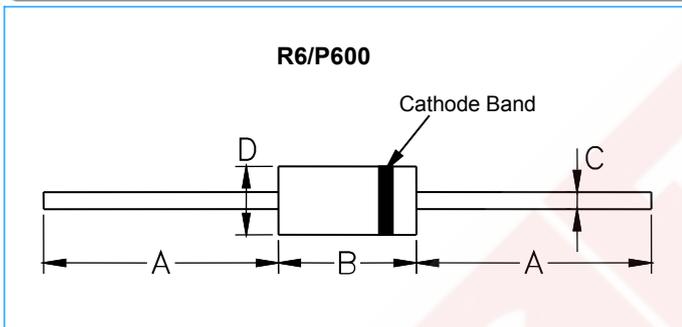
Features

- ◆ Glass passivated chip junction in P600 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 8000W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time
- ◆ RoHS compliant



R6/P600

Dimensions



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.64	9.14
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.64	9.14

Electrical Characteristics (T_A=25°C unless otherwise noted)

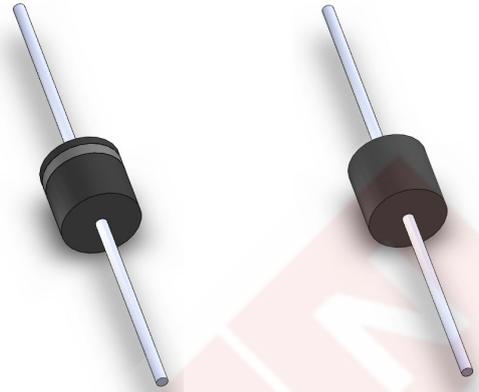
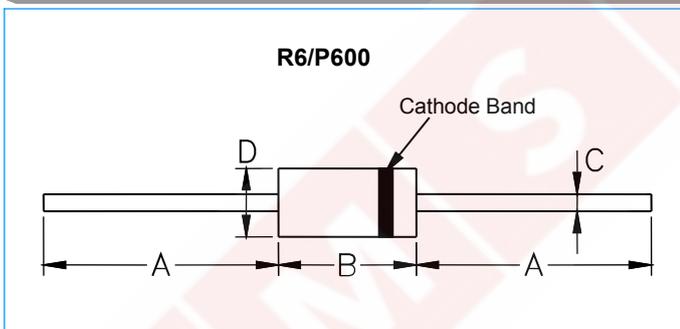
Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (µA)
Uni	Bi		MIN	MAX				
8KP24A	8KP24CA	24	26.7	29.5	1	38.9	206	5
8KP33A	8KP33CA	33	36.7	40.6	1	53.3	150	5
8KP36A	8KP36CA	36	40.0	44.2	1	58.1	148	5
8KP40A	8KP40CA	40	44.4	49.1	1	64.5	124	5
8KP43A	8KP43CA	43	47.8	52.8	1	69.4	115	5

Axial Lead Transient Voltage Suppressors (TVS)
15KPA Series 17 To 280 V 15000W
Features

- ◆ Glass passivated chip junction in P600 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 15000W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Uni-directional

Bi-directional


R6/P600
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.64	9.14
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.64	9.14

Axial Lead Transient Voltage Suppressors (TVS)
15KPA Series 17 To 280 V 15000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
			MIN	MAX				
Uni	Bi							
15KPA17A	15KPA17CA	17	18.99	20.79	50	29.3	515.4	5000
15KPA18A	15KPA18CA	18	20.11	22.01	50	30.9	488.7	5000
15KPA20A	15KPA20CA	20	22.34	24.46	20	34.3	440.2	1500
15KPA22A	15KPA22CA	22	24.57	26.91	10	37.1	407.0	500
15KPA24A	15KPA24CA	24	26.81	29.35	5	40.7	371.0	150
15KPA26A	15KPA26CA	26	29.04	31.80	5	44.0	343.2	50
15KPA28A	15KPA28CA	28	31.28	34.24	5	47.5	317.9	25
15KPA30A	15KPA30CA	30	33.51	36.70	5	50.7	297.8	15
15KPA33A	15KPA33CA	33	36.90	40.40	5	54.7	276.1	2
15KPA36A	15KPA36CA	36	40.20	44.00	5	59.8	252.5	2
15KPA40A	15KPA40CA	40	44.70	48.90	5	65.8	229.5	2
15KPA43A	15KPA43CA	43	48.00	52.60	5	69.8	216.3	2
15KPA45A	15KPA45CA	45	50.30	55.00	5	72.8	207.4	2
15KPA48A	15KPA48CA	48	53.60	58.70	5	77.7	194.3	2
15KPA51A	15KPA51CA	51	57.00	62.40	5	82.9	182.1	2
15KPA54A	15KPA54CA	54	60.30	66.00	5	87.7	172.2	2
15KPA58A	15KPA58CA	58	64.80	70.90	5	93.8	161.0	2
15KPA60A	15KPA60CA	60	67.00	73.40	5	97.4	155.0	2
15KPA64A	15KPA64CA	64	71.50	78.30	5	104.2	144.9	2
15KPA70A	15KPA70CA	70	78.20	85.60	5	113.6	132.9	2
15KPA75A	15KPA75CA	75	83.80	91.70	5	122.0	123.8	2
15KPA78A	15KPA78CA	78	87.10	95.40	5	126.1	119.7	2
15KPA85A	15KPA85CA	85	94.90	104.00	5	137.6	109.7	2
15KPA90A	15KPA90CA	90	100.50	110.10	5	145.6	103.7	2
15KPA100A	15KPA100CA	100	111.70	122.30	5	161.3	93.6	2
15KPA110A	15KPA110CA	110	122.90	134.50	5	178.6	84.5	2
15KPA120A	15KPA120CA	120	134.00	146.80	5	192.3	78.5	2
15KPA130A	15KPA130CA	130	145.20	159.00	5	208.3	72.5	2
15KPA150A	15KPA150CA	150	167.60	183.50	5	241.9	62.4	2
15KPA160A	15KPA160CA	160	178.70	195.70	5	258.6	58.4	2
15KPA170A	15KPA170CA	170	189.90	207.90	5	272.7	55.4	2
15KPA180A	15KPA180CA	180	201.10	220.10	5	288.5	52.3	2
15KPA200A	15KPA200CA	200	223.40	244.60	5	319.1	47.3	2
15KPA220A	15KPA220CA	220	245.70	269.10	5	428.6	42.2	2
15KPA240A	15KPA240CA	240	268.10	293.50	5	384.6	39.3	2
15KPA260A	15KPA260CA	260	290.40	318.00	5	416.7	36.2	2
15KPA280A	15KPA280CA	280	312.80	342.40	5	454.5	33.2	2

Note:

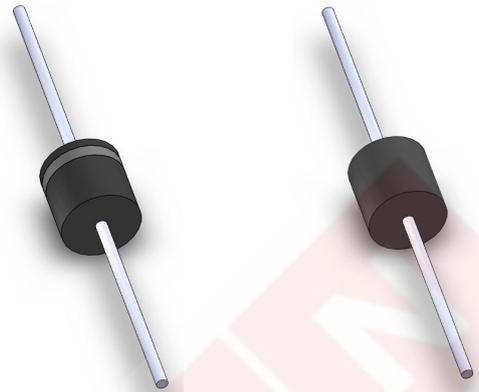
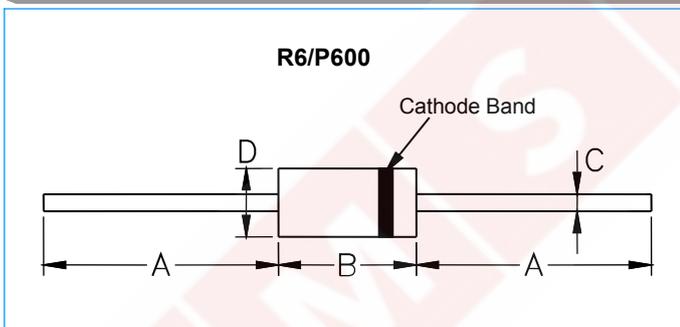
- For Bi-Directional devices having V_R of 30 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)
20KPA Series 20 To 300 V 20000W
Features

- ◆ Glass passivated chip junction in P600 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 20000W Peak power capability at 10 × 1000µs waveform Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ C \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

Uni-directional

Bi-directional


R6/P600
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.64	9.14
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.64	9.14

Axial Lead Transient Voltage Suppressors (TVS)
20KPA Series 20 To 300 V 20000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi		MIN	MAX				
20KPA20A	20KPA20CA	20	22.34	50	36.8	548.9	5000	5000
20KPA24A	20KPA24CA	24	26.81	50	41.2	490.3	5000	5000
20KPA26A	20KPA26CA	26	29.04	50	22.7	451.9	2000	1500
20KPA28A	20KPA28CA	28	31.28	50	48.0	420.8	1000	500
20KPA30A	20KPA30CA	30	33.51	5	51.5	392.2	250	150
20KPA32A	20KPA32CA	32	35.74	5	54.3	372.0	150	50
20KPA34A	20KPA34CA	34	38.00	5	57.5	351.3	50	25
20KPA36A	20KPA36CA	36	40.20	5	61.5	328.5	20	15
20KPA40A	20KPA40CA	40	44.70	5	67.8	297.9	15	2
20KPA44A	20KPA44CA	44	49.10	5	72.7	277.9	2	2
20KPA48A	20KPA48CA	48	53.60	5	79.4	254.4	2	2
20KPA52A	20KPA52CA	52	58.10	5	85.8	235.4	2	2
20KPA56A	20KPA56CA	56	62.60	5	92.6	218.1	2	2
20KPA60A	20KPA60CA	60	67.00	5	97.6	207.0	2	2
20KPA64A	20KPA64CA	64	71.50	5	104.0	194.2	2	2
20KPA68A	20KPA68CA	68	76.00	5	110.0	183.6	2	2
20KPA72A	20KPA72CA	72	80.40	5	116.0	174.1	2	2
20KPA80A	20KPA80CA	80	89.40	5	130.0	155.4	2	2
20KPA88A	20KPA88CA	88	98.30	5	142.0	142.3	2	2
20KPA96A	20KPA96CA	96	107.20	5	155.0	130.3	2	2
20KPA104A	20KPA104CA	104	116.20	5	168.0	120.2	2	2
20KPA112A	20KPA112CA	112	125.10	5	182.0	111.0	2	2
20KPA120A	20KPA120CA	120	134.00	5	194.0	104.1	2	2
20KPA132A	20KPA132CA	132	147.40	5	213.0	94.8	2	2
20KPA144A	20KPA144CA	144	160.80	5	232.0	87.1	2	2
20KPA160A	20KPA160CA	160	178.70	5	258.0	78.3	2	2
20KPA172A	20KPA172CA	172	192.10	5	277.0	72.9	2	2
20KPA180A	20KPA180CA	180	201.10	5	291.0	69.4	2	2
20KPA192A	20KPA192CA	192	214.50	5	309.0	65.4	2	2
20KPA204A	20KPA204CA	204	227.90	5	329.0	61.4	2	2
20KPA216A	20KPA216CA	216	241.30	5	348.0	58.0	2	2
20KPA232A	20KPA232CA	232	159.10	5	374.0	54.0	2	2
20KPA240A	20KPA240CA	240	268.10	5	387.0	52.2	2	2
20KPA256A	20KPA256CA	256	286.00	5	412.0	49.0	2	2
20KPA280A	20KPA280CA	280	312.80	5	451.0	44.8	2	2
20KPA300A	20KPA300CA	300	335.10	5	483.0	41.8	2	2

Note:

- For Bi-Directional devices having V_R of 40 volts and under, the I_R limit is double

Axial Lead Transient Voltage Suppressors (TVS)

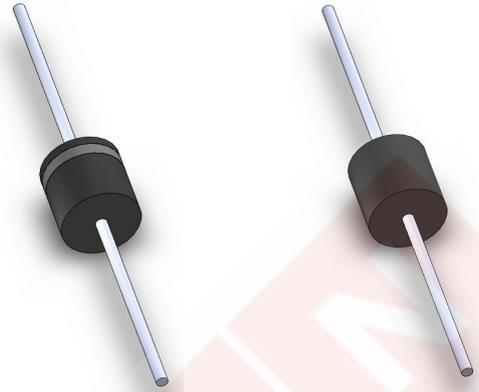
30KPA Series 28 To 288 V 30000W

Features

- ◆ Glass passivated chip junction in P600 Package
- ◆ Low leakage
- ◆ Uni and Bidirectional unit
- ◆ Excellent clamping capability
- ◆ 30000W Peak power capability at 10 × 1000µs waveform
Repetition rate (duty cycle):0.01%
- ◆ Fast response time: typically less than 1.0ps from 0 Volts to V_{BR} min
- ◆ Typical I_R less than 5µA above 12V.
- ◆ High Temperature soldering: 260°C/40 seconds at terminals
- ◆ Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR}@25^\circ\text{C} \times \Delta T$
- ◆ Plastic package has Underwriters Laboratory Flammability 94V-0
- ◆ Matte tin lead-free Plated
- ◆ Halogen free and RoHS compliant
- ◆ Typical failure mode is short from over-specified voltage or current
- ◆ Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ◆ IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)
- ◆ ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- ◆ EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)

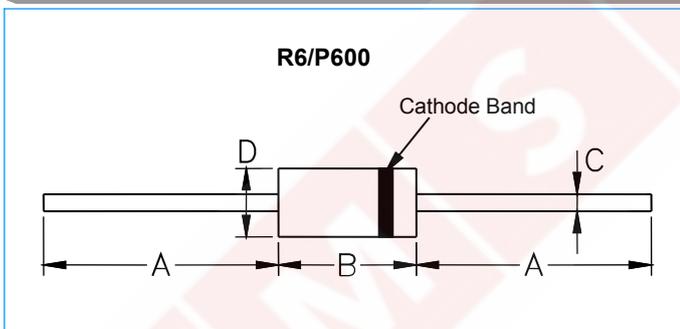
Uni-directional

Bi-directional



R6/P600

Dimensions



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.340	0.360	8.64	9.14
C	0.048	0.052	1.22	1.32
D	0.340	0.360	8.64	9.14

Axial Lead Transient Voltage Suppressors (TVS)
30KPA Series 28 To 288 V 30000W
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T	Test Current I _T (mA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Reverse Leakage I _R @V _{RWM} (μA)
Uni	Bi		MIN				
30KPA28A	30KPA28CA	28	31.28	50	50.0	606.0	5000
30KPA30A	30KPA30CA	30	33.51	50	55.2	548.9	5000
30KPA33A	30KPA33CA	33	36.90	50	58.5	517.9	5000
30KPA36A	30KPA36CA	36	40.20	50	61.8	490.3	5000
30KPA39A	30KPA39CA	39	43.60	20	67.2	450.9	2000
30KPA42A	30KPA42CA	42	46.90	10	72.0	420.8	1000
30KPA43A	30KPA43CA	43	48.00	10	73.0	415.1	1000
30KPA45A	30KPA45CA	45	50.30	5	77.4	391.5	250
30KPA48A	30KPA48CA	48	53.60	5	81.6	371.3	150
30KPA51A	30KPA51CA	51	57.00	5	86.4	350.7	50
30KPA54A	30KPA54CA	54	60.30	5	91.4	331.5	20
30KPA58A	30KPA58CA	58	64.80	5	92.4	327.9	20
30KPA60A	30KPA60CA	60	67.00	5	102.0	297.1	15
30KPA64A	30KPA64CA	64	71.50	5	104.0	291.3	10
30KPA66A	30KPA66CA	66	73.70	5	107.0	283.2	2
30KPA70A	30KPA70CA	70	78.20	5	109.0	278.0	2
30KPA71A	30KPA71CA	71	79.30	5	111.5	271.7	2
30KPA72A	30KPA72CA	72	80.40	5	114.0	265.8	2
30KPA75A	30KPA75CA	75	83.80	5	119.4	253.8	2
30KPA78A	30KPA78CA	78	87.10	5	129.0	234.9	2
30KPA84A	30KPA84CA	84	93.80	5	139.2	217.7	2
30KPA90A	30KPA90CA	90	100.50	5	146.4	207.0	2
30KPA96A	30KPA96CA	96	107.20	5	156.0	194.2	2
30KPA102A	30KPA102CA	102	113.90	5	165.6	183.0	2
30KPA108A	30KPA108CA	108	120.60	5	175.2	172.9	2
30KPA120A	30KPA120CA	120	134.00	5	194.4	155.9	2
30KPA132A	30KPA132CA	132	147.40	5	213.0	142.3	2
30KPA144A	30KPA144CA	144	160.80	5	223.2	135.8	2
30KPA150A	30KPA150CA	150	167.60	5	233.4	129.8	2
30KPA156A	30KPA156CA	156	174.30	5	245.0	123.7	2
30KPA160A	30KPA160CA	160	178.70	5	252.6	120.0	2
30KPA168A	30KPA168CA	168	187.70	5	272.4	111.2	2
30KPA170A	30KPA170CA	170	189.90	5	275.0	110.2	2
30KPA180A	30KPA180CA	180	201.10	5	290.4	104.3	2
30KPA198A	30KPA198CA	198	221.20	5	319.8	94.7	2
30KPA216A	30KPA216CA	216	241.30	5	348.6	86.9	2
30KPA240A	30KPA240CA	240	268.10	5	387.0	78.3	2
30KPA258A	30KPA258CA	258	188.20	5	416.4	72.8	2
30KPA260A	30KPA260CA	260	290.40	5	416.0	72.8	2
30KPA270A	30KPA270CA	270	301.60	5	436.2	69.5	2
30KPA280A	30KPA280CA	280	312.80	5	464.0	65.3	2
30KPA288A	30KPA288CA	288	321.70	5	469.9	64.5	2

Note:

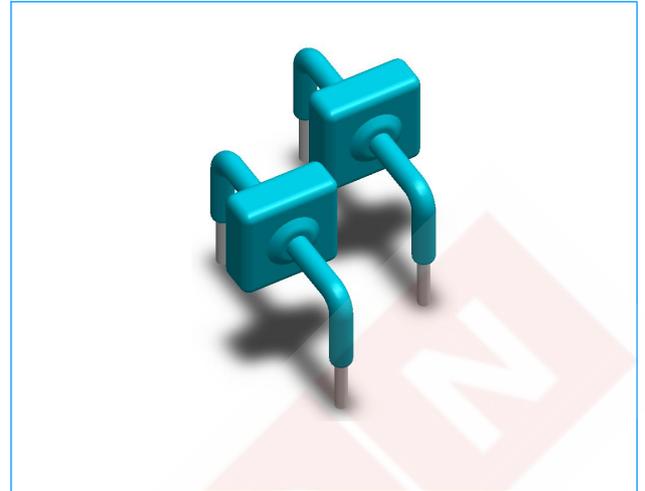
- For Bi-Directional devices having V_R of 40 volts and under, the I_R limit is double

Radial Lead Transient Voltage Suppressors (TVS)

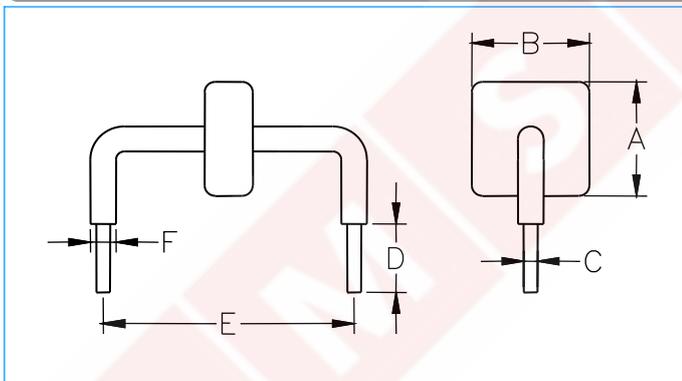
K Series 1KA To 10KA

Features

- ◆ Axial lead terminals
- ◆ High current transient suppressor
- ◆ Excellent Clamping Capability
- ◆ Glass Passivated Junction
- ◆ Bi-directional
- ◆ Low Slope Resistance
- ◆ Repetition Rate (duty cycle):0.01%
- ◆ Hazardous Substances Free
- ◆ RoHS Compliant
- ◆ High Temperature soldering: 260°C/10 seconds at terminals
- ◆ Epoxy Encapsulated
- ◆ Silver plated leads
- ◆ Solderable per MIL-STD-202 Method 208



Dimensions



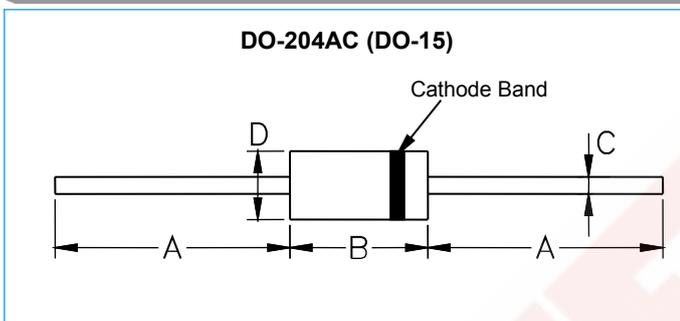
Dimensions	Inches	Millimeters
A	max 0.571	max 14.5
B	Max0.500	max 12.7
C	$\Phi 0.051 \pm 0.004$	$\Phi 1.30 \pm 0.1$
D	0.236 ± 0.040	6.0 ± 1.0
E	0.950 ± 0.028	24.15 ± 0.7
F	max 0.10	max 2.5

Radial Lead Transient Voltage Suppressors (TVS)
K Series 1KA To 15KA
Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number	Reverse Stand-Off Voltage		Breakdown Voltage	Test Current	Current Rating	Maximum Energy	Maximum Clamping Voltage	Reverse Leakage
	VAC(V)	VDC(V)	V _{BR} (V) MIN.@I _T	I _T (mA)	I _{PP} 8/20μs (KA)	10/1000μs (A)	V _C (V) @I _{PP}	I _R (μA) @VDC
K1-076	54	76	83	10	1	-	135	20
KA-012	8.5	12.8	14	1	3	500	28	20
KA-015	11	15	17	1	3	650	30	20
KA-020	14	20	22	1	3	800	40	20
KA-025	17	25	28	1	3	950	50	20
KA-030	21	30	33	1	3	1200	60	20
KA-042	30	42	47	1	3	1700	77	20
KA-058	40	58	64	1	3	2450	110	20
KA-066	45	66	70	1	3	2600	125	20
KA-076	54	76	85	1	3	2800	140	20
KA-100	72	100	110	1	3	4250	165	20
KA-133	100	133	147	1	3	5300	220	20
KA-170	130	170	180	1	3	7000	260	20
KA-190	145	190	200	1	3	8400	290	20
KA-200	150	200	222	1	3	8600	330	20
KA-240	180	240	250	1	3	9100	340	20
KB-012	8.5	12.8	14	1	6	1000	28	20
KB-015	11	15	17	1	6	1300	30	20
KB-020	14	20	22	1	6	1600	40	20
KB-025	17	25	28	1	6	1900	50	20
KB-030	21	30	33	1	6	2400	60	20
KB-042	30	42	47	1	6	3400	77	20
KB-058	40	58	64	1	6	4900	110	20
KB-066	45	66	70	1	6	5200	125	20
KB-076	54	76	83	1	6	5600	135	20
KB-100	72	100	110	1	6	8500	165	20
KB-133	100	133	147	1	6	10600	220	20
KB-170	130	170	180	1	6	14000	260	20
KB-190	145	190	200	1	6	16800	290	20
KB-200	150	200	222	1	6	17200	330	20
KB-240	180	240	250	1	6	18000	340	20
KB-275	210	275	300	1	6	19000	435	20
KB-300	230	300	330	1	6	25500	470	20
KB-380	275	380	401	1	6	30000	520	20
KC-012	8.5	12.8	14	1	10	1665	28	20
KC-015	11	15	17	1	10	2164	30	20
KC-020	14	20	22	1	10	2664	40	20
KC-025	17	25	28	1	10	3163	50	20
KC-030	21	30	33	1	10	3996	60	20
KC-042	30	42	47	1	10	5661	77	20
KC-058	40	58	64	1	10	8158	110	20
KC-066	45	66	70	1	10	8658	125	20
KC-076	54	76	83	1	10	9324	135	20
KC-100	72	100	110	1	10	14152	165	20
KC-133	100	133	147	1	10	17649	220	20
KC-170	130	170	180	1	10	23310	260	20
KC-190	145	190	200	1	10	27972	290	20
KC-200	150	200	222	1	10	28638	330	20
KD-012	8.5	12.8	14	1	15	2665	28	20
KD-015	11	15	17	1	15	3464	30	20
KD-020	14	20	22	1	15	4264	40	20
KD-025	17	25	28	1	15	5063	50	20
KD-030	21	30	33	1	15	6396	60	20
KD-042	30	42	47	1	15	9061	77	20
KD-058	40	58	64	1	15	13058	110	20
KD-066	45	66	70	1	15	13858	125	20
KD-076	54	76	85	1	15	14924	145	20

Axial Lead Transient Voltage Suppressors (TVS)
SAC Series 5.0 To 50 V 500W Low Capacitance
Features

- ◆ Glass passivated chip
- ◆ 500W peak pulse power capability with a 10/1000µs waveform, repetitive rate (duty cycle): 0.01%
- ◆ Low leakage
- ◆ Excellent clamping capability
- ◆ Very fast response time
- ◆ RoHS compliant


DO204AC (DO-15)
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.087	1.960	2.200
B	0.171	0.191	4.350	4.850
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440

Electrical Characteristics (T_A=25°C unless otherwise noted)

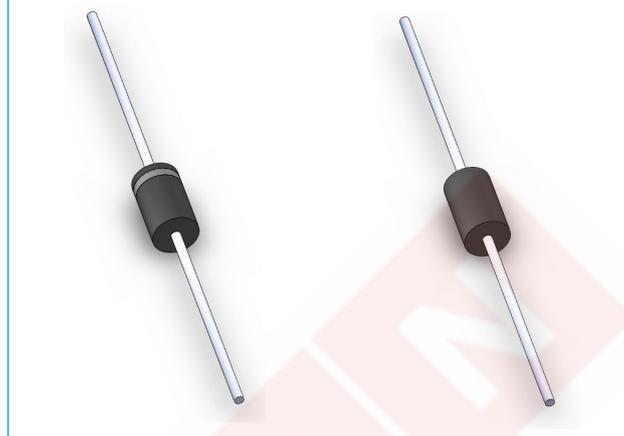
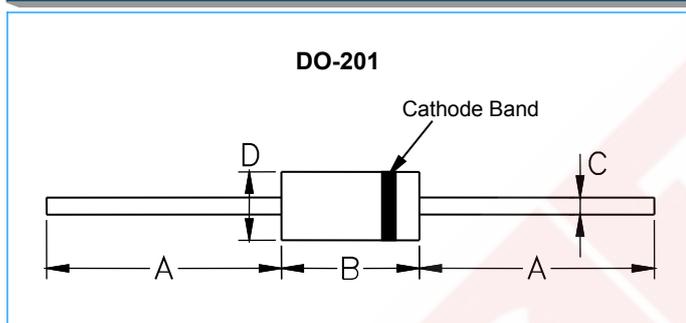
Part Number	Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} @I _T =1.0mA (V)	Maximum Reverse Leakage I _R @V _{RWM} (µA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Junction Capacitance @0V (pF)	Working Inverse Blocking Voltage V _{WIB} (V)	Inverse Blocking Leakage Current I _{IB} @V _{WIB} (mA)	Peak Inverse Voltage V _{PIB} (V)
		MIN							
SAC5.0	5.0	7.60	300	10.0	44.0	50	75	1	100
SAC6.0	6.0	7.90	300	11.2	41.0	50	75	1	100
SAC7.0	7.0	8.33	300	12.6	38.0	50	75	1	100
SAC8.0	8.0	8.89	100	13.4	36.0	50	75	1	100
SAC8.5	8.5	9.44	50	14.0	34.0	50	75	1	100
SAC10	10.0	11.10	5	16.3	29.0	50	75	1	100
SAC12	12.0	13.30	5	19.0	25.0	50	75	1	100
SAC15	15.0	16.67	5	23.6	20.0	50	75	1	100
SAC18	18.0	20.00	5	28.8	15.0	50	75	1	100
SAC22	22.0	24.40	5	35.4	14.0	50	75	1	100
SAC26	26.0	28.90	5	42.3	11.1	50	75	1	100
SAC30	30.0	33.30	5	48.6	10.0	50	75	1	100
SAC36	36.0	40.00	5	60.0	8.6	50	75	1	100
SAC45	45.0	50.00	5	77.0	6.8	50	150	1	200
SAC50	50.0	55.50	5	88.0	5.8	50	150	1	200

Axial Lead Transient Voltage Suppressors (TVS)
LCE Series 6.5 To 90 V 1500W Low Capacitance
Features

- ◆ Glass passivated chip
- ◆ 1500W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01%
- ◆ Low leakage
- ◆ Excellent clamping capability
- ◆ Very fast response time
- ◆ RoHS compliant

Uni-directional

Bi-directional


DO-201
Dimensions


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.285	0.375	7.24	9.53
C	0.038	0.042	0.97	1.07
D	0.189	0.209	4.79	5.30

Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number	Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} @I _T (V)		Test Current I _T (mA)	Maximum Reverse Leakage I _R @V _{RWM} (μA)	Maximum Clamping Voltage V _C @I _{PP} (V)	Maximum Peak Pulse Current I _{PP} (A)	Maximum Junction Capacitance @0V (pF)	Working Inverse Blocking Voltage V _{WIB} (V)	Inverse Blocking Leakage Current I _{IB} @V _{WIB} (mA)	Peak Inverse Voltage V _{PIB} (V)
		Min	Max								
LCE6.5	6.5	7.22	8.82	10	1000	12.3	100	100	75	1	100
LCE6.5A	6.5	7.22	7.98	10	1000	11.2	100	100	75	1	100
LCE7.0	7.0	7.78	9.51	10	500	13.3	100	100	75	1	100
LCE7.0A	7.0	7.78	8.60	10	500	12.0	100	100	75	1	100
LCE7.5	7.5	8.33	10.20	10	250	14.3	100	100	75	1	100
LCE7.5A	7.5	8.33	9.21	10	250	12.9	100	100	75	1	100
LCE8.0	8.0	8.89	10.90	1	100	15.0	100	100	75	1	100
LCE8.0A	8.0	8.89	9.83	1	100	13.6	100	100	75	1	100
LCE8.5	8.5	9.44	11.50	1	50	15.9	94	100	75	1	100
LCE8.5A	8.5	9.44	10.40	1	50	14.4	100	100	75	1	100
LCE9.0	9.0	10.00	12.20	1	10	16.9	89	100	75	1	100
LCE9.0A	9.0	10.00	11.10	1	10	15.4	97	100	75	1	100
LCE10	10.0	11.10	13.60	1	5	18.8	80	100	75	1	100
LCE10A	10.0	11.10	12.30	1	5	17.0	88	100	75	1	100
LCE11	11.0	12.20	14.90	1	5	20.1	74	100	75	1	100
LCE11A	11.0	12.20	13.50	1	5	18.2	82	100	75	1	100
LCE12	12.0	13.30	16.30	1	5	22.0	68	100	75	1	100
LCE12A	12.0	13.30	14.70	1	5	19.9	75	100	75	1	100
LCE13	13.0	14.40	17.60	1	5	23.8	63	100	75	1	100
LCE13A	13.0	14.40	15.90	1	5	21.5	70	100	75	1	100
LCE14	14.0	15.60	19.10	1	5	25.8	58	100	75	1	100
LCE14A	14.0	15.60	17.20	1	5	23.2	65	100	75	1	100
LCE15	15.0	16.70	20.40	1	5	26.9	56	100	75	1	100
LCE15A	15.0	16.70	18.50	1	5	24.4	61	100	75	1	200
LCE16	16.0	17.80	21.80	1	5	28.8	52	100	75	1	200
LCE16A	16.0	17.80	19.70	1	5	26.0	57	100	75	1	200
LCE17	17.0	18.90	23.10	1	5	30.5	49	100	75	1	200
LCE17A	17.0	18.90	20.90	1	5	27.6	54	100	75	1	200
LCE18	18.0	20.00	24.40	1	5	32.2	46	100	75	1	200
LCE18A	18.0	20.00	22.10	1	5	29.2	51	100	75	1	200
LCE20	20.0	22.20	27.10	1	5	35.8	42	100	75	1	200
LCE20A	20.0	22.20	24.50	1	5	32.4	46	100	75	1	200
LCE22	22.0	24.40	29.80	1	5	39.4	38	100	75	1	200
LCE22A	22.0	24.40	26.90	1	5	35.5	42	100	75	1	200
LCE24	24.0	26.70	32.60	1	5	43.0	35	100	75	1	200
LCE24A	24.0	26.70	29.50	1	5	38.9	39	100	75	1	200
LCE26	26.0	28.90	35.30	1	5	46.6	32	100	75	1	200
LCE26A	26.0	28.90	31.90	1	5	42.1	36	100	75	1	200
LCE28	28.0	31.10	38.00	1	5	50.1	30	100	75	1	200
LCE28A	28.0	31.10	34.40	1	5	45.5	33	100	75	1	200
LCE30A	30.0	33.30	36.80	1	5	48.4	31	100	75	1	100
LCE33A	33.0	36.70	40.60	1	5	53.3	28	100	75	1	100
LCE36A	36.0	40.00	44.20	1	5	58.1	26	100	75	1	100
LCE40A	40.0	44.40	49.10	1	5	64.5	23	100	75	1	100
LCE43A	43.0	47.80	52.80	1	5	69.4	22	100	75	1	100
LCE45A	45.0	50.00	55.30	1	5	72.7	21	100	75	1	100
LCE48A	48.0	53.30	58.90	1	5	77.4	19	100	75	1	100
LCE51A	51.0	56.70	62.70	1	5	82.4	18	100	75	1	100
LCE54A	54.0	60.00	66.30	1	5	87.1	17	100	100	1	125
LCE58A	58.0	64.40	71.20	1	5	93.6	16	100	100	1	125
LCE60A	60.0	66.70	73.70	1	5	96.8	16	100	100	1	125
LCE64A	64.0	71.10	78.60	1	5	103.0	15	100	100	1	125
LCE70A	70.0	77.80	86.00	1	5	113.0	13	100	125	1	150
LCE75A	75.0	83.30	92.10	1	5	121.0	12	100	125	1	150
LCE85A	85.0	94.40	104.00	1	5	129.0	12	100	125	1	150
LCE90A	90.0	100.00	111.00	1	5	146.0	10	100	125	1	150